APOLLO 10 EVENT INDEX TO A/G TRANSCRIPT

APOLLO 10

TABLE 3-I.- SEQUENCE OF EVENTS

Event	Time, hr:min:sec
Range zero - 16:49:00 G.m.t., May 18, 1969	
Lift-off	00:00:00.6
Maximum dynamic pressure	00:01:22.6
S-IC outboard engine cutoff	00:02:41.6
S-II engine ignition (command)	00:02:43.1
Launch escape tower jettison	00:03:17.8
S-II engine cutoff	00:09:12.6
S-IVB engine ignition (command)	00:09:13.6
S-IVB engine cutoff	00:11:43.8
Parking orbit insertion	00:11:53.8
S-IVB ignition (translunar injection)	02:33:28
Translunar injection (S-IVB cutoff + 10 sec)	02:39:21
Command and service module separation	03:02:42
First docking	03:17:37
Spacecraft ejection	03:56:26
Spacecraft separation maneuver	04:39:10
First midcourse correction	26:32:57
Lunar orbit insertion	75:55:54
Lunar orbit circularization	80:25:08
Undocking	98:11:57
Command and service module separation maneuver	98:47:17
Descent orbit insertion	99:46:02
Phasing orbit insertion	100:58:26
Lunar module staging	102:45:17
Ascent insertion maneuver	102:55:02
Coelliptic sequence initiation	103:45:55
Constant differential height maneuver	104:43:53
Terminal phase initiation	105:22:56

TABLE 3-I.- SEQUENCE OF EVENTS - Concluded

Event	Time, hr:min:sec
Second docking	106:22:02
Ascent stage jettison	108:24:36
Final separation maneuver	108:43:23
Ascent engine firing to propellant depletion	108:52:06
Transearth injection	137:36:29
Second midcourse correction	188:49:58
Command module/service module separation	191:33:26
Entry interface (400 000 feet altitude)	191:48:55
Enter communications blackout	191:49:12
Exit communications blackout	191:53:40
Drogue deployment	191:57:18
Main parachute deployment	191:58:05
Landing	192:03:23

KING This is Apollo Saturn Launch Control, 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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/18/69, 10:32 am 2/1

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.

END OF TAPE

PAO This is Apollo/Saturn Launch Control 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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

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

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.

END OF TAPE

KING This is Apollo Saturn Launch Control, 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

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.

END OF TAPE

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

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.

END OF TAPE

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.

END OF TAPE

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

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.

END OF TAPE

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

PAO This is Apollo/Saturn Launch Control 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.

END OF TAPE

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 thrust. Once that occurs we will get COMMIT, meaning that the 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

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 the hour. Stafford reports the clock has started. The tower 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.

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.

SC Second staging ...

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.

SC And we have guidance initiation.

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.

SC Just like old times. It's beautiful out there.

CAPCOM You guys sound ecstatic.

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.

PAO 171 miles downrange, 67 miles high, at 4 minutes 15 seconds. Still GO.

PAO Glynn Lunney taking a status check. Everyone says GO. Four minutes 50 seconds, 230 miles downrange, 67 miles high.

CAPCOM 10, Houston. In 5 minutes you are all GO. All your systems are looking great.

SC Roger, 5 minutes and 10 is GO.

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.

CAPCOM That's go.

SC Yaw 1.

CAPCOM That's go.

SC Pitch 2.

CAPCOM That's go.

SC Yaw 2.

CAPCOM You got them all, Tom.

SC Looks good.

PAO Guidance says it's looking real good. It's 6 minutes 23 seconds.

CAPCOM - no, I think Snoopy is still there 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.

SC ... sense arm and 9 + 11 for SII.

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.

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.
SC - everything looks good.
CAPCOM Roger, Apollo 10, you are GO for staging.
CAPCOM Mark mode IV, Apollo 10, mode IV.
SC Rog, mode IV. Staging.
CAPCOM Rog.
SC Separation.
CAPCOM Roger.
SC Appears we got good ignition.
CAPCOM Roger.
PAO Thrust is good and guidance has initiated on the S-IVB stage, the third stage.
SC Charlie, lots of stuff out the window in staging. We catching up and passing it now.
CAPCOM Okay.
SC Okay. Guidance looks right on the ..., Charlie.
CAPCOM Rog, we confirm that. Looking great here. You are looking beautiful.
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.

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.

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.

END OF TAPE

CC 10, Houston. Your SIVB is straight; 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.

SC Roger, understand. Close the primary back pressure valve and activate the secondary loop.

CC Roger; just for a little while. 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.

SC Roger; and we have closed the isolation valve on CM RCS ring one two is still open.

CC Roger.

CC 10; Houston. Your Saturn is in great shape; you're configured for orbit; we are all GO.

SC Roger; just looks beautiful.

CC And 10, Houston. We confirm your orbit. The IU vector has you in a 103 by 100.

SC Roger.

SC 10; Houston. We want you to keep the primary back pressure valve closed for about 15 minutes. And then we'll deacti - stand by.

SC Roger.

SC 10; Houston. At GET of 30 we'd like you to put the primary back pressure valve back in AUTO and deactivate the secondary loop.

SC Roger, understand. You want - at 30 - 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 Island station. Showing a liftoff time of 12:49:00.70 Easterr 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.

CC Correct - 10, your first step would be to close the RCS propellant isolation valve on ring 2.
SC We'll be able to do that right now, Charlie.
CC Okay, then you can - then we'd like 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.
SC Okay, turned the heaters on right now.
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.
SC Okay, and we'll turn them off after 15 minutes and you say we can monitor one on C5?
CC You can monitor the oxidizer line temp on C5 - it'll probably be all scale high, but if you see any change, we would appreciate you telling us.
SC Roger. Okay, we got that Charlie.
CC 10, after 15 minutes, we'd like for you to turn the heater off, RCS logic off, and open both heater circuit breakers.
SC Roger; will do, Houston.
SC Charlie, it's just fantastic to be back up here again½ 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.

END OF TAPE

PAO This is Apollo Control at 24 minutes into 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.

END OF TAPE

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.

PAO That's Astronaut Bruce McCandless putting in a call.

CAPCOM Apollo 10, this is Houston through Tananarive. How do you read? Over.

COMTECH Tananarive, Houston COMTECH Net 1.

TAN Houston COMTECH, Tananarive.

COMTECH Roger, can you confirm that CAPCOM is uplinking through your site?

TAN That's affirm. You are uplinking.

COMTECH Have you heard any downlink from the spacecraft?

TAN Negative, no downlink.

COMTECH Roger.

CAPCOM Apollo 10, this is Houston through Tananarive. Radio check, over.

CAPCOM Apollo 10, this is Houston transmitting in the lbind Confirm simplex alpha, over.

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.

SC We're been reading you all the time 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?

SC That's affirmative, George.

CAPCOM Okay.

SC Houston, Apollo 10. The (garble) on the first heater is off scale high which we expected on the heaters and we're going to turn the heaters off at 43.

CAPCOM Say again, Apollo 10. You're fading 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.

SC Roger, understand 52. Our radiators 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.

SC That's affirm, and the evaporator 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.

PAO This is Apollo Control at 43 minutes. 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 Houston.

END OF TAPE

PAO This is Apollo Control at 52 minutes into the mission of Apollo 10. Carnarvon has acquired Apollo 10. We will stand by for transmission.

CAPCOM Hello Apollo 10, Houston through Carnarvon standing by.

SC Roger, Houston, this is Apollo 10. We are going through our EC8 checklist and everything looks good.

CAPCOM Roger, Tom, sounds real great.

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?

CAPCOM Roger, Tom, you were pretty weak. 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.

SC It was 41 minutes even, Charlie, that's what I paid special attention to that.

CAPCOM Roger, thank you very much , John, 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.

SC I just rechecked a secondary loop and it 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.

SC That's affirm, I sure did. I went to AUTO on the steam pressure valve and the water valve.

CAPCOM Okay, we want the steam pressure back to MANUAL and we're going to think about it a little bit more and we might reservice a little later on.

SC Okay, fine, looks like our radiator is beginning to carry the load. I'm looking at about 51 degrees

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.
SC Roger, Houston, Apollo 10 reading you 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.

END OF TAPE

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 his system. There is one minor problem in with the E-comm. 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.

END OF TAPE

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 Grand Bahama. The crew has extended the docking probe. 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.

SC Roger, Houston, read you loud and clear.

CAPCOM Rog, you're 5 by.

SC Okay, we are ready to extend the docking probe when you are.

CAPCOM Roger, stand by.

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 Roger. TLI + 90. Go ahead, Charlie

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 737661992420871 67.

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

delta VC 66199 242087167, boresight star is Achernan and it's left 008 down 27 - 2605 - 025001122933993012553 5. Okay, your set stars are Deneb and Vega at 067283337, no ullage. Your P37 for TLI + 4 is 006306373, the longitude is - 165, GET 400K is 002211. Ready for your readback.

SC Okay, Charlie, here it comes. SPS G&N 63556 - 148 + 135003554487 - 05484 - four balls 1 + 66232, you with me?

CAPCOM Go ahead.

SC 180239001, third apogee is NA, perigee is + 00175664587376619924208716 7, boresight star is Shawla, left 008, down 27 - 2605 - 025001122933993012553 5 Still there?

CAPCOM Keep going.

SC Okay, Deneb and Vega, 06728337, no ullage, TLI + 4, 006306373 - 16502221 and you are just a little bit fast on those reads, Charlie. I was barely able to keep with you.

CAPCOM Roger, Gene. Sorry about that. That was a good readback and we got the TLI pad if you are ready to copy.

SC Stand by one.

SC Okay, I'm ready.

CAPCOM Okay. Top A63, 22425179116, three balls, burn time 5431043763560335815104 0, TLI + 10 minute abort pitch angle is 267. Standing by for your readback.

SC Okay, TLI is 22425179116000, burn time is 54310437635603, roll is 358151040 and TLI + 10 minutes pitch is 267 degrees.

CAPCOM Rog. The burn looks - is going to look real nominal. The sep angles - everything is real nominal and your backup S-IVB key cards are okay. Pitch and yaw, everything looks good.

SC That's great, Charlie. We ought to be coming up on a dump here pretty soon.

CAPCOM Rog. You ought to be right over.

CAPCOM 10, Houston. On the TLI, we've got a string of nines on the probability for guided cut-off.

SC Can't beat that.

CAPCOM Sure can't.

SC You're doing good work so far, Charlie.

CAPCOM So are you guys. You guys sounded ecstatic on that boost.

SC Babe, you ain't seen nothing until you've seen that S-IC stage.

CAPCOM Laughter. Would you care to elaborate?

SC I will later.

CAPCOM Okay.

SC It's real smooth between the start and the end of this burn.
CAPCOM Laughter.
SC There's no doubt the whole structure and load were restaged.
CAPCOM Yes, you kind of felt like you were pulling yourself away from the 8-ball, there.
SC No, that was structural POGP we will tell you about it later.
CAPCOM Okay. Chris says, don't forget now, it's 8 days.
SC Laughter, okay.
CAPCOM Hello, 10, Houston. We got our load at Bermude. We are ready to go if you will give us accept.
SC In accept and we are through, go.
CAPCOM Rog.
CAPCOM Hello Apollo 10, Houston. We got the load in okay, you can go back to block, the computer is yours.
SC Through that block.
CAPCOM Rog.
SC Houston, Apollo 10. We are ready for our latest orbit cell.
CAPCOM Stand by.
CAPCOM 10, Houston. We're showing you in a 107 by 104.
SC Roger.
CAPCOM Hello, Apollo 10, Houston. We think that your primary evap is definitely dried out, so we are going to leave it as is and if we have to, we will reservice it after TLI.
SC Okay. After I close the vent on it, it started off the low peg and now has drifted off to a reading of about .24.
CAPCOM Roger.
SC Roger. The spacecraft temp is starting to cool down. We feel real good in here.
CAPCOM Rog, good, Tom. 10, Houston. We will have you through the Canaries until 1 + 55, expect for about a 30-second break at about 1 + 43, when we go from Vanguard to the Canaries.
SC Roger.
CAPCOM A short break at about 1 + 49, excuse me.
SC Roger.
CAPCOM 10, Houston. How the view up there? Your windows all look good?
SC Windows are all clear. Gene has

a white streak across his external one. Just a white streak on the right window.

CAPCOM Rog. We copy. How wide is it? Is it significant at all?

SC No, Charlie, it looks like someone took a little thin paint brush and just stabbed across from top to bottom on the right hand window.

CAPCOM Rog. And 10, Houston. High bit rate, that probe -

END OF TAPE

CAPCOM And 10, Houston with the high bit rate that probe test hanging right in there at 85.

SC Thank you.

CAPCOM Hello, Apollo 10, Houston through the Canaries, standing by. We are GO for the power on at any time.

SC Okay, Charlie, I'll get it right now.

CAPCOM Okay.

SC Fix logic to batteries, pull on the breakers and logic 1 and logic 2 are coming off.

CAPCOM Roger, stand by.

CAPCOM 10, Houston, would you verify that the 6 arm breakers are closed.

SC Roger, 6 arms coming closed now (garbled)

CAPCOM Roger.

CAPCOM And 10, Houston, your pyro system looks good. We're GO.

SC Okay I'll just prepare TLI.

CAPCOM Right, Tom, and we'd like you go to up telemetry command reset at Canaries LOS.

SC Say again.

CAPCOM Roger, at Canaries LOS you can go up telemetry command to reset.

SC Thank you.

SC Houston, Apollo 10, we're donning our helmets and gloves now.

CAPCOM Roger.

CAPCOM 10, Houston, everybody in the room is happy as can be. You are looking great. We'll have LOS at Canaries at 1 plus 56, we'll see you over Tananarive at 2 plus 09.

SC Alright, roger.

PAO This is Apollo Control. The Canary Island station has loss of signal. We're 37 minutes 22 seconds away from the translunar injection burn of the third stage of the Saturn V, the S-IVB stage. TLI planned for 2 hours 33 minutes 25 seconds. At that time the engine will burn for a duration of 5 minutes 43 seconds to place Apollo 10 on the way to the moon. DELTA-V added to the present velocity of 10 438 feet per second. The present orbital parameters 107 by 104 nautical miles. The ground controllers do feel that the primary evaporator has dried out, however, we will not reservice the evaporator until after the translunar injection burn. The crew reports that the cabin is comfortable. We've got a window report. Tom Stafford reporting the windows clear, one thin white streak on Gene Cernan's window which is no problem. The next station to acquire will be Carnarvon. At 2 hours 25 minutes, this is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control at 2 hours 9 minutes into the mission. Tananarive has acquired Apollo 10. We'll stand by.

CAPCOM Hello Apollo 10, Houston through Tananarive standing by. We've got nothing for you.

SC Okay, Houston, we're (garbled) and we're all set for TLI.

CAPCOM Roger. We'll try to come up through ARIA at about 2 plus 14, Tom. They say the circuit markings look good from ARIA 3. The other aircraft it's sort of marginal, but we'll probably try.

SC ARIA at 2 plus 14.

CAPCOM Roger.

PAO ARIA stands for Apollo Range Instrumented Aircraft. There are 2 of these flying tracking stations between Tananarive and Carnarvon so that we will have the capability of continuous communication from now through TLI.

PAO We are 22 minutes away from translunar injection.

CAPCOM Hello 10, Houston, coming up on LOS at Tananarive. We'll give you a call through ARIA 3 in a minute or so.

SC Roger, we're all squared away for the burn, Houston.

CAPCOM Right, Tom.

CAPCOM Hello Apollo 10, Apollo 10, Houston through ARIA 3. How do you read?

SC (garbled)

CAPCOM Roger, you are there, 10, but unreadable.

SC (garbled)

PAO This is Apollo Control at 2 hours 20 minutes. Even though the voice communications through ARIA 3 are unsatisfactory, indications are that ARIA is getting good telemetry from the spacecraft. We're 12 minutes 50 seconds away from translunar injection. We'll continue to stay up live in case we are able to communicate through either of the 2 ARIAs between Tananarive and Carnarvon.

PAO This is Apollo Control at 2 hours 22 minutes. The total velocity that Apollo 10 will be shooting for in this third stage burn for translunar injection is 35 594.8 feet per second. The GET time of ignition 2 hours 33 minutes 25 seconds. GET time of engine cutoff, 2 hours 39 minutes 9 seconds.

CAPCOM Hello Apollo 10, Houston through ARIA-5. Do you read?

END OF TAPE

CAPCOM Hello, Apollo 10, Houston through Carnarvon. Over.

SC Roger, through Carnarvon. The time base 6 started right on time, Charlie.

CAPCOM Roger, the S-IVB is looking great, Tom. It's pressurizing okay.

SC And I can see the pressure building up and I'm at 5305, 4, 5, Mark. 5305 on your mark.

CAPCOM Roger, we're about 3 seconds ahead of you.

SC Houston, Apollo 10. Fuel tank pressure is up to 30.

CAPCOM Roger, copy.

PAO Those tank pressures are in reference to the S-IVB. Time base 6 is a program in the instrument unit of the S-IVB which programs it for the translunar injection.

PAO Telemetry shows Apollo 10's present velocity 25,570 feet per second.

PAO Present altitude 105 nautical miles. Three minutes to translunar injection and Flight Director Glynn Lunney -

SC Three minutes, counting off.

CAPCOM Roger, 10. You're GO for TLI. S-IVB is looking as planned.

SC Good show. We've got the old eight ball working on number 2 and powered up P47.

CAPCOM Okay.

SC Go. 13040 turns. 2VC servo power on.

SC S-II sep light on.

CAPCOM Roger.

SC Space go.

CAPCOM Very well.

END OF TAPE

SC	Max turn rate; you want 10 degrees?
SC	Exceed 10 degrees, very well.
PAO	Booster engineer says the Saturn is GO.
SC	Right on time.
CC	Roger; copy.
SC	Fuel lead in the Starboard. Getting acceleration?
CC	Roger.
SC	Right on.
CC	Roger.
SC	We've done it.
CC	Roger.
SC	We're on the way.
CC	Roger; we confirm.
CC	10; Houston. Your SIVB looks good.
SC	Roger.
CC	And Guidance looks good.
SC	Roger.
SC	It's right.
PAO	26 400 per second velocity now.
CC	Hello Apollo 10, Houston, in 1 minute, you're looking great.
SC	Roger; 1 minute, everything looks good onboard.
SC	It's starting to pick up the yaw just as programmed.
CC	Roger.
PAO	Velocity 27 500 feet per second.
CC	10 - 2 minutes. You're looking great.
SC	Roger.
SC	What a way to watch a sun rise.
CC	Roger.
PAO	That was Gene Cernan.
PAO	29 000 feet per second.
SC	3/4 of a G.
CC	Roger, copy Tom.
PAO	Tom Stafford reporting 3/4 of one G.
CC	Apollo 10, Houston; coming up 3 minutes; trajectory looks great.
SC	3 minutes - everything looks good Charlie.
CC	Apollo 10, Houston. We've got a predicted cutoff 2 plus 39 plus 10.
SC	2 plus 39 plus 10. Wow, right into the sun here.
CC	Roger.
PAO	31 000 feet per second velocity. Present altitude 123 miles.
CC	The SIVB is looking great.
SC	Roger, Houston, 10 here, looks good onboard.
SC	We're getting a (garble) sequence.

SC We're getting small YAW.
CC Understand. A small YAW isolation ....?
SC Had frequency vibrations.
CC Ah, so. It's 5 minutes. We still have you. Go, 10.
CC 10, Houston, in the blind, at cutoff of telemetry. Are you to accept?
SC SECO.
CC Roger, SECO. We confirm the cut-off.
SC 8 dot 422.1 of telemetry.
CC Roger, copy.
SC 10, would you believe, my DELTA VC is minus .6
CC Roger. Minus .6 on the DELTA VC. That's beautiful.
SC Great spacecraft, Charlie. And, Charlie, we've got an 02 flow high light in the middle of the burn here which we can't account for.
CC Stand by, John.
CC Apollo 10, Houston, in the blind. Have LOS at Redstone 2plus 41. See you over Hawaii. 2 plus 44.
SC Roger....shoot that thing. I went to auto 2 on the suit circuit water accumulator. That's all that I can think of. It was right at 10 minutes when it happened.
CC Roger. We think that cabin pressure rigs kicked in for the 02 flow, John.
SC It just went off and the flow started to drop now, Charlie.
CC Okay, fine. You are beginning to fade out. I think we are beginning to lose you through the Redstone area in about 30 seconds. Hawaii 2 plus 44.
CC And 10, in the blind. Everything we have is nominal. You are on your way.
PAO This is Apollo Control. 2 hours and 41 minutes into the mission. Apollo 10 on the way to the moon. We have lost signal for about 3 or 4 minutes. We will pick up at Hawaii at 2 hours 44 minutes. This is Mission Control in Houston.

END OF TAPE

PAO This is Apollo Control 2 hours 44 minutes. Charlie Dukes just put in a call to the spacecraft. We're showing present altitude 608 nautical miles. The velocity starting to drop off already, 33 602 feet per second.

CAPCOM Hello Apollo 10, Houston through Hawaii. How do you read? Over.

SC Roger, Houston, Apollo 10, would you believe the world is starting to fade away?

CAPCOM Roger, we believe it, Tom, you are all Go here. FIDO confirms it was a perfect insertion. We would like you to confrim you are on omni DELTA, and we're all GO.

SC Roger.

SC We're on omni DELTA, Charlie, and there isn't any question about it from here.

CAPCOM Roger.

SC I don't mean the DELTA, I mean the world.

CAPCOM We got you, we understand.

CAPCOM 10, Houston, we expect the S-IVB to start to the sep attitude at 2 plus 54 plus 10, right on time, and your sep attitude is looking good.

SC Roger, Okay. John's in the left seat now and I'm in the center seat. We've already changed.

CAPCOM Roger, Tom. Did you get a chance to get that radiation survey meter out?

SC Yes, I did, Charlie, and I read zero on every scale.

CAPCOM Okay. And what was the GET on that, Gene? About 245?

SC About 243.

CAPCOM Okay.

CAPCOM 10, Houston, we'll have you AOS now until you get to LOS at the moon.

SC Sounds like Chris has pretty good coverage.

CAPCOM Yes sir. He's sitting back there smiling.

SC You ought to see us.

CAPCOM Chris says there ain't no backing out now.

SC That's for sure.

SC You can play our favorite song, Charlie, the one about Fly me Someplace or Somewhere.

CAPCOM Roger. That's up to you. We've got 3 Marshall guys down here smiling from ear to ear, too.

PAO The Marshall guys Charlie Duke refers to are the booster systems engineers on the console and what they refer to is the trench.

PAO Velocity is 32 603 feet per second, altitude 857 nautical miles.

CAPCOM Apollo 10, Houston, we would like you to do a avert 66 to get the state vector in the right position, and if you've got time comment on the ordeal tracking there for that backup TLI.

SC Okay, the initial track was just right on what the nominal was and the ordeal was looking just what it should be.

CAPCOM Roger, Tom.

PAO Heart rates during that long S-IVB burn Tom Stafford 116, John Young 97, Gene Cernan 104.

SC Say, Charlie, looks like we might have a little closed circuit TV up here.

CAPCOM How's it looking, Gene?

SC I don't know, I can't really tell too much, but at least it works full circuit.

CAPCOM Okay, fine. Gold Stone's all configured, we'll be standing by.

SC Charlie, it's beautiful closed circuit.

CAPCOM Hey, great, Gene. We can't wait -

SC I've got my own little show of these 2 guys up here. It's beautiful, it really is.

CAPCOM Well great. I hope it's that good down here. We're sitting on pins and needles waiting for it. Hey, if you've got a second Tom we'd like for you to recap the S-IVB oscillations and give the guys one up on starting work on it.

SC Yes, okay, all the way through even into earth orbit boost the IV-B had just a slight little - it like both lateral and longitudnal vibrations to it, and after - it felt like it was running rough at least compared to the Titan, and then after 3 minutes superinposed upon the low frequency vibrations came a real high frequency vibration, I'd say in the ball park of 20 cps, something like that, and of course we were sweating it all the way but it shut down right on time, but there was a definite shift to a high frequency super imposed upon the low frequency at about 3 minutes into the TLI burn.

CAPCOM Roger, did it give you a feeling like it 2.2 Mach in a -

END OF TAPE

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 02 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.

PAO That's John Young. He will do 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.

END OF TAPE

PAO Those are the SLA panels that house the lunar module. They've been jettisoned.
SC Charlie, I've got the world on 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.
SC Have you got the color?
CAPCOM Yes sir. It's looking great.
SC I'm sorry it's tilted a little bit. 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 it great. How's the color, Charlie?
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

SC beautiful once we can show you the Earth.
CAPCOM Rog. Old Snoopy sure looks good.
SC Yep, he sure do. Old Charlie Brown is a mass of cord and wire floating around here though.
CAPCOM I can imagine.
SC 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.
SC Now we've got it in real life. 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 Yea. Hey, the color is great, Gene.
SC How's that for the front porch.
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.

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

END OF TAPE

SC Charlie, we can't be more than about 5 or 10 feet away.
CAPCOM Roger.
CAPCOM 10, it's looking real stable, we show you closed in tightly.
SC Be docked in a second, I hope.
CAPCOM Roger.
CAPCOM 10 , Houston, you're looking good. We can figure your marking on your rendezvous window. Looks like you just docked.
SC Roger, we're on the captures, we haven't fired yet.
CAPCOM Roger.
CAPCOM Gene, we can read the numbers on the LM 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.
CAPCOM Roger. Didn't look like there was hardly any after-dock post-docking of oscillations.
SC Yes.
SC Okay barrells coming off.
CAPCOM Roger.
CAPCOM 10, that's a great picture of the quads.
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.
SC Okay, John's going down to the LEB and I'm going to the left seat now.
CAPCOM Roger, Tom. We're standing by.
CAPCOM Apollo 10, Houston, we'd like for you 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.
SC Charlie, you're going to have to look at the same picture for a while until we get this (garbled) check complete.
CAPCOM Roger, we understand you are busy.
SC Okay, I marked it.
SC Houston, this is 10. We are in the process of attempting to pressurize the tunnel.

END OF TAPE

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.

SC Snap, snap and we're there and got two 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 Roger. Gene, that's a great picture of 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.

SC Okay, John's going down to the LEB, and I'm going to the left seat now.

CAPCOM Roger, com. We're standing by.

CAPCOM Apollo 10, Houston. We'd like you safe for logic.

SC Charlie, you're going to have to look at 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.

CAPCOM Roger, Gene. Give me a call when you got time to copy an evasive pass.

SC Okay, I will.

SC Charlie, go ahead. I'll take the evasive over.

CAPCOM Roger. You're ready to copy. We have 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?

SC I'm still with you. It's just ... I got gloves on yet.

CAPCOM Okay. Want me to slow down?

SC Yeah, just go to where you are.

CAPCOM Rog. 061255358, apogee and perigee are N/A, 0019700300150. The rest of the pad is N/A and no ullage.

SC Rog. Charlie, repeat real pitch and yaw.

CAPCOM Roger. 061255358. Did you copy?

CAPCOM Apollo 10, Houston. Do you read?

END OF TAPE

CC Apollo 10, Houston. Do you read?
SC 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?
SC Okay. I've got you on OMNI and I'll copy the rest of the pad on OMNI until I get high gain back again. I got roll of 061, pitch of 255 and give me your YAW.
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.
SC Okay. Roger. I would reckon 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.

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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1543, GET 354 34/1

PAO This is Apollo Control at 3 hours, 54 minutes. We have 2 to 3 minutes of tape at this conference at the Cape. We'll play that for you now.

SC Houston, Apollo 10.

CAPCOM Go ahead, Tom.

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.

CAPCOM Okay. You've got lots of pieces floating around?

SC A few.

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 now. The Command Module Service Module and the LM have 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.

SP Houston, we're maneuvering around right now at the quarter S-IVB area according to the accepted attitude.
CAPCOM Roger.
SP Houston, that was fans in auto or off on the 02.
CAPCOM ON Gene, on.
SP There on. ON.
CAPCOM Rog.
SP Okay, Houston, we can see the IVB now.
CAPCOM Roger. Out of which window, Tom.
SC John's looking out the hatch window.
CAPCOM Rog.
SC Houston, it's the S-IVB in the TV right now.
CAPCOM Roger. We got it right over the quad - thrusters there Gene.
SC That's it. I'll see if I can bring it into you.
CAPCOM Right. Thanks.
CAPCOM 10, that TV is really fantastic.
SC It looks like the dome there of the 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?
CAPCOM Rog. Gene. That zoom was real 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.
CAPCOM Rog. We're going out to the networks now. I think they probably heard it, but we'll pass it on though.
SC You tell the people who worked 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.

END OF TAPE

CAPCOM The IVB's really good.
SC I'd estimate now that we're a good 300 to 400 feet away.
CAPCOM Roger.
SC And we're slowly going away. We're starting to see one side of it.
CAPCOM Roger.
CAPCOM And 10, Houston. ... can see your thrusters firing up there on the S-IVB.
SC Good show. I can't even see him from here. He must be about 2500 miles away.
CAPCOM Laughter. You're looking out the wrong window.
SC I'm sure going to like Snoopy, because that's all I'm going to see.
PAO Distance from the earth now 13,531 miles, velocity 16,063 feet per second.
SC Okay, I've got the IVB out my window now.
SC Okay, Houston. This is CDR. I've got the IVB out of my window here.
CAPCOM Roger, Tom. It's looking great. It's a pretty hot bright network. We'd like you to keep the camera moving around so we don't burn anything.
SC Houston, this is 10. Can you see all the 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.
SC That better?
CAPCOM On the black and white it is. 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.
SC Charlie, we're looking for the earth 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

PAO the nominal evasive maneuver time, however, 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.

SC Then, we're still moving away from the 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.

END OF TAPE

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.

SC Thank you Charlie we got it.

CC Roger.

SC Hello, Houston, Apollo 10.

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.

SC 02 CRYO fan, CHARGE.

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.

SC Okay, Houston. Apollo 10 coming up to 5 minutes. We are going to start our gimbal drive check.

CC Roger. Copy.

SC Pitch 1 coming on. YAW 1 on.

CC Roger.

SC Pitch 2 coming on.

CC Roger.

SC YAW 2 coming on.

END OF TAPE

PAO This is Apollo Control. Tom Stafford 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.

SC Okay, Houston. Coming up on 2 minutes. 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.

SC SBS shows 90 BF5.

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 we 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.

CAPCOM You can start the battery charge.
SC Okay.
CAPCOM Apollo 10, Houston. With somebody down in the LEB, we'd like a readout of the LM CM delta P.
SC Roger. John ... will get it for you.
CAPCOM Rog.
SC Roger. We're reading 8 tenths right now.
CAPCOM Roger, copy. 8 tenths.
SC Make that 8500.
CAPCOM Okay.
CAPCOM Apollo 10, Houston. In about 3 minutes we're going to have a short LOX dump on the saturn.
SC Okay, we can't see it. It's just long gone from us.
CAPCOM Okay.
SC Hello Houston. This is 10.
CAPCOM Go ahead.
SC Okay, I'm reading 100.5 percent oxidizer 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.
SC With the right hand, we could use the 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.
CAPCOM Apollo 10, Houston. We have an update for your P23 attitudes and stars if you care to copy at this time.
SC Okay. Go ahead.
CAPCOM Roger, Gene. At 5 hours this attitude 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.
CAPCOM That's affirmative, and we've got an update to your stars also on page 3-9 if you're ready to copy.
SC Yeah, go ahead.

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 alse peacock 42 near horizon.

END OF TAPE

CC Set 3 is also Peacock, 42 near horizon. and the last 2 sets 4 and 5 on Antaree far horizon.

SC Did you say Peacock set 3 was far horizon?

CC Negative, near horizon for sets 2 and 3 on Peacock.

SC Okay.

CC Okay. 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.

CC apollo 10, Houston.

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.

CC Hello Charlie Brown, Houston. Over.

CC Hello Apollo 10 Houston, over.

CC Hello Charlie Brown, this is Houston. Do you read? Over.

PAO This is Apollo Control. We are receiving data from Apollo 10.

CC Charlie Brown. This is Houston 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.

SC Hello, Houston, this is Apollo 10.

CC Go ahead, Tom. We are reading you now.

CC 10, Houston. We are reading you intermittent.

END OF TAPE

SC Hello, Houston. Houston, how you read?

CAPCOM Roger. 55 zing, how many.

SC Houston, Apollo 10. How do you read?

CAPCOM Reading a 5 by how many.

CAPCOM Apollo 10, Apollo 10, this is Houston. How do you read? Over.

SC Stand Houston, do you read?

SC Hello Houston, Houston. This is 10. How do you read?

capcom Rog. Read me a 5 by zing how many.

SC Reading you alright now. I've 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.

CAPCOM That's affirmative. We've been 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.

SC Okay. I'm on omni C right now. 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.

PAO This is Apollo Control. 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 13 176 feet per second.

SC Charlie, if you see this, it's 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.

CAPCOM 10, Houston. We're looking for the TV. How does the high gain signal strength look to you?

SC It's loud and clear.

CAPCOM Roger.

SC Still nothing Charlie?
PAO Picture coming up shortly.
SC I figure we should be over the United States, Mexico .....
SC Hey, it's really beautiful Tom. 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 out. Baja, California. Can't tell whether you have any fog in LA or not but Alaska is pretty much fogged in.
CAPCOM Rog.
SC It's really a beautiful picture.
SC We'll just let it go here for a couple of minutes.
CAPCOM Okay, thanks. Do you know on your 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.
CAPCOM 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.
CAPCOM Rog. We feel that we've got a 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.

RIVETS

488-0391

Time

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 1949, GET 500 39/3

SC — Yeah, okay. The brown spot is the Rocky Mountains down around New Mexico up into Colorado.

CAPCOM — Roger.

SC — This resolution is fantastic. The LM you can count the rivets on it and yet the earth and the colors are really beautiful.

SC — Okay, well I am clear a bit on a certain part of the earth here, I'll try to slip in on the Rocky Mountains and California.

CAPCOM — Rog. Stand by Tom.

SC — How's that Charlie, better?

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.

SC — Okay we'll move it around.

CAPCOM — Looks like we've got some clouds down over New Orleans and down that way.

SC — Yeah. Okay Charlie, that's full zoom.

CAPCOM — Okay, this is got to be the greatest sight ever.

SC — You ought to see it up here.

CAPCOM — Hey Tom, boy. It is really fantastic. 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 now. We can see Mexico and the clouds up over the Rockies. It's really a fantastic sight. Almost see the freeways in LA.

SC — Right. I'm going to move down you can take a look down by the Gulf of Mexico now.

CAPCOM — Roger.

SC — Charlie, it's so hard to describe. 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.

SC — That's great. And the blackest black that you'd ever could conceive is the setting for all this.

CAPCOM — Rog.

END OF TAPE

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.
CC Roger. You guys are really giving us a great show. This is fantastic.
SC We just went to thank all the people who helped get us up here, Charlie.
CC Roger. I know.
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.
SC Sorry, I must have knocked it 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.

SC Yes, it's coming in now.
CC It's really blue, you guys.
SC We are looking right at you. Looks like a few clouds right now in Houston.
CC It's sort of a constant overcast here in Amoca, but we have never been.
SC You are right on the edge of 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.
CC Roger. You know, it looks to us that it is just completely clouded up over that way.
SC You might say we have moved up the last couple of hours.
CC Well, I'll say. We got you at about 26,000 miles here - or a little bit more.
SC Okay, I am going to put the zoom 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?
CC Stand by.
CC Roger, they look okay to us, John.
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.

CC 10, Houston. How do the stars look in this attitude?
SC In the telescope, I have difficulty 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.
CC Okay. Through the sextant they are okay?
SC Affirm.
CC Okay.
SC The Earth 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.
SC Houston, I have a question. Does 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.
SC 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.

PAO	The distance is 22,781 miles.
CC	Somebody is crying in his beer.
SC	No, I think he is happy, too.
CC	I am kidding.

END OF TAPE

CAPCOM Hello Apollo 10, Houston. We'd like for you to put the S-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 Roger.

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

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.

CAPCOM Roger, stand by. You have our go for power on, 10.

SC Okay, powers have come up and on.

CAPCOM Rog. 10, Houston. 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.

SC Okay, we're standing by for your 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.

SC Okay, I'm going to count down to sep.

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

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 you loud and clear. We had a little noise there a minute or so ago. It sounded like the S-band was getting weak.

SC Okay, we're in now and I believe 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 up-link. 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.

SC We're maneuvering auto maneuver to 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

PAO This is Apollo Control at 6 hours, 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.

SC Houston, this is Apollo 10. Have you already loaded that variation measure for us?

CAPCOM Stand by.

CAPCOM Apollo 10, Houston. Stand by.

SC If you've had the right hook-in numbers in there, I just don't know if the option is right.

CAPCOM Apollo 10, this is Houston. Roger we loaded that in your racer board. Should be good.

CAPCOM Apollo 10, this is Houston. Did you copy?

SC Yes sir. Thank you Bruce.

CAPCOM Roger up.

CAPCOM Apollo 10, this is Houston. Over.

SC Roger. Go ahead.

CAPCOM Roger 10. There will be no midcourse 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

CAPCOM I've got 3P 37 pass to pass.

SC Okay, stand by.

SC Looks like the S-IVB did a good 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.

CAPCOM Roger. P 37 block data for PLI plus 11 hours 01330 5201 minus 16504637 over.

SC Go ahead.

CAPCOM Roger. TLI plus 25 hours 027305795 minus 16507028.

SC Okay.

CAPCOM Roger. TLI PLUS 35 hour pass. 037305037 minus 16509435 read back over.

SC TLI plus 11 is 013305201 minus 16504637. Plus 25 is 027305795 and minus 1657028. And 35 is 037305037 minus 1650 minus - correction 9435.

CAPCOM Roger, Apollo 10. 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.

SC Okay. Should I go ahead and turn 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.

END OF TAPE

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.

CAPCOM Roger. We'd like you to do an optics calibration at the end of this P23. Over.

SC Reg. What star do you suggest? I can't see any of them out here much.

CAPCOM Roger. Stand by.

SC And that was the end of it near as I can figure.

CAPCOM Okay.

CAPCOM Apollo 10, this is Houston. We're recommending that you use star 33 Antareous for the optics cal. Over.

SC I thought you'd say that.

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 now. I don't believe that the TV and the PTC are compatible.

SC No right, Bob. Give us an attitude so we can make an auto maneuver show on the TV after we finish here.

CAPCOM Roger. We'll have it in a minute or so.

SC We can hold the camera out the side hatch and it's compatible with the PTC, don't you think?

CAPCOM Stand by.

CAPCOM Apollo 10, this is Houston. Over.

SC Go ahead.

CAPCOM Roger. On the TV we're working towards 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 mags on.

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.

SC That's affirm. We're called to turn it 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.

SC Point conception is clear as a bell.

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

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SC less, but we're looking ... Looking for 100, but we know a gage error could be most of that.

CAPCOM Roger. We'll get you a good correlation 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.

END OF TAPE

CAPCOM Apollo 10, this is Houston, over.
SC Go ahead, over.
CAPCOM Roger, further analysis shows that that roll 263 degree angle they gave you is not compatable with high gain antenna. You're going to have to put the 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.
SC Roger. Now what number do you want us to load into noun 87? Four balls 5.
CAPCOM Stand by. 10, this is Houston. There's no need to load a number in. Just hit proceed and go from where you are. 10, Houston. You copy.
SC Roger, that's what we did, Bruce and, of course, we're all done so that will be good for the next time we disturbe a horizon.
CAPCOM Roger, out.
SC We loaded a zero when we first started this thing which probably accounts for some of the update.
CAPCOM Roger.
SC Houston, Apollo 10. Do you have a 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.
SC Roger. Roll 02300, pitch is 181, yaw is 041, pitch is plus 28, and yaw is minus 07.
CAPCOM Negative, read back again please.
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.

END OF TAPE

CAPCOM Apollo 10, this is Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger. On telemetry, we showed 95 psi 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.

SC Okay. Real fine. We showed 90. I knew there could be some instrument errors, I just wanted to correlate.

CAPCOM Roger. 95 is the numbers that we've got.

SC Okay, roger. We're going to the TV attitude now.

CAPCOM Roger. 10, if you'd be interested, there is a possibility of a waste water dump during TV.

SC Okay, great. You can substitute another 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.

SC Okay. And I suddenly have it over here.

CAPCOM Roger.

SC We'll give high gain a try now.

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.

CAPCOM Apollo 10, this is Houston. Roger, up.

SC Okay. In fact, I can now see the Hawaiian Islands. The subsolar point is right over the Hawaiian Islands. You can see them from here.

CAPCOM Roger. We haven't got you on TV yet.

SC Okay.

END OF TAPE

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.
SC Okay, again it's kind of an awkward 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.
SC How's that, Bruce?
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 -
SC Houston, we're going to zoom in on 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 very well in this picture.
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

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.

SC Okay, we are in PU. PU and accept.

CAPCOM Apollo 10, this is Houston. You all planning any interior shots this pass?

SC We can turn on the flood lights for just a minute here.

CAPCOM Okay.

END OF TAPE

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 Rog. We're at locked.
CC Roger. Okay, you're coming through on our black and white monitor now very well. We'll see the color in a minute.
SC Okay, John is just sitting up side down 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.
SC John has his suit off and all stowed. Gene and I don't.
CC Okay, we got a good look at the DISCS a few seconds ago as you panned past it.
SC Okay.
CC Okay we see your pack on the screen right out can you zoom in on that a little.
CC That's coming through loud and clear now.
SC That's the best I can do. I'll try to focus it closer.
CC Roger.
CC That's the one on the front cover 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.
CC That's how I can tell who it is.

SC All right.
SC You can see the sun coming in over my shoulder and on top, it's really tremendous.
CC Yes, indeed. Certainly is bright there.
SS For your information, all these are at F22.
CC Roger.
SC In fact, that's what we shot the earth at F22.
CC Roger.
SC Looks like you got some suntan yesterday, Tom.
SC Right. I have to stay healthy there Charlie.
SC I'll take it back over here to my left window to show you earth again.
CC Roger.
CC Okay 10, we're getting the earth now. We've got the terminator to our left and it looks like the south pole on the top of the screen.
CC Apollo 10, this is Houston. We're 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.
SC Stand by. It's in outside
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

END OF TAPE

SC Houston, I was just wondering if this target I'm tracking out here in the sextant might be the SIVB by chance.

CAPCOM Can you give me some angles on it. Maybe we can do something with that?

SC Roger. You're looking at them.

CAPCOM 6517 and 80857.

SC How's that, Bruce, are we right side up?

CAPCOM It's looking good, Tom.

SC You can see the terminator really starting to move across the United States now.

CAPCOM Yes indeed. Would you say the terminator 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.

PAO This picture is coming to us from an 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 Roger. Reading you loud and clear now.

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.

CAPCOM Stand by. We'd like to count you down on the dumping and monitor at our TM as well as on board. Over.

SC Roger. I thought you only wanted to do these things before a maneuver.

CAPCOM Yeah. Well, we've got midcourse correction 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.

SC Okay.

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?

CAPCOM 10, this is Houston. Roger, we're getting 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.

SC Okay, well I tell you what. We're going 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 Roger. Why don't you go ahead and run 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.

SC Okay, Houston. We're realigning right now to the PTC REFSMAT and we're going to gyro torque.

CAPCOM This is Houston. Roger out.

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control at 8 hours, 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.

SC Okay, I have been looking at about 39 maybe 39.2 volts on this battery for about the last 20 minutes, do you want me to keep going to 39.5.

CC That's on Battery A?

SC That's affirm.

CC That's affirmative. Keep charging until you get to 39.5.

SC All right.

CC 10, this is Houston. I have the waste water dump procedure here.

SC Stand by.

SC Okay, you can go ahead with the procedure.

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?

CC That's correct.

SC Okay, we are ready to go ahead with the waste water dump at anytime here.

CC Roger. Proceed with the waste 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.

SC Roger. That's good. We;re all finished here for today. We got other things we have to take care of.

CC Roger. Out.
SC Houston, Apollo 10. Did most of the color look pretty good on your monitor, Bruce?
CC Oh, it really looked beautiful, Tom. It really did.
SC Okay. Good show. Thank you.
SC Snoopy has been awful quiet out there. How is he looking to you?
CC Stand by. 10, this is Houston. 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.
SC Okay.

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.

END OF TAPE

PAO This is Apollo Control at 8 hours, 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.

CAPCOM 10, this is Houston. Could you 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.

CAPCOM Roger, we're showing just about 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.

SC Do you want us to terminate the 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.

SC Okay, we're kind of busy right now, 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.

SC Okay, John's already aligned to the 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.

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.
SC Roger, for row 03, 0012, row 04, 13256, row 05 is 33266.
CAPCOM Roger, that's affirm on row 3 that was 3 balls 12.
SC Roger, 3 balls 12.
CAPCOM Okay, Tom. I got some flight plan update items here if you're ready to note them down now.
SC Go ahead.
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'11 find out. Okay Tom, we'11 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 then.
SC Okay. One thing we've noticed here 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

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?

SC Haven't got to it yet.

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.

END OF TAPE

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

PAO This is Apollo Control at 9 hours, 5 minutes 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 report. This period of time is set aside for the crew to 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.

CAPCOM Okay, Gene. This is Houston. Rog. We'd 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.

END OF TAPE

PAO This is Apollo Control at 9 hours, 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.

MCC Roger, Stand by monitor for 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

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.

END OF TAPE

PAO This is Apollo Control - 10 hours, 2 minutes 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 - O2 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.

SC How'd the liftoff look to you?

CAPCOM Beautiful.

SC Oh, I'll tell you, man. 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.

CAPCOM The T&D looked real good on the TV it looked 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.

CAPCOM Goldstone. Read you loud and clear How me?

CAPCOM Roger. Loud and clear. Thank you.

END OF TAPE

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. A 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.

SC Okay. I think we're set up in the PTC 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.

SC Okay, I'll give you a call.

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 what you want. I can't get a good lock on - on B right now.

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.

SC — Houston, 10. I'm in DELTA right now.
CAPCOM — Rog. Understand, Gene. On DELTA.
SC — Hello, Houston, Apollo 10.
CAPCOM — Roger, 10. Go ahead.
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.
CAPCOM — Apollo 10, Houston. When you get a chance, the man on the left would like to have DDR readouts for all three of you.
SC — What?
CAPCOM — TRD, I'm sorry. Dosimeter readouts.
SC — Man, I think they're all stowed in the suits.
CAPCOM — Okay.
SC — Houston, Apollo 10.
CAPCOM — Roger, 10, go ahead.
SC — Okay, Joe. One thing we'd like to do - 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?
CAPCOM — Okay, Tom, this is Houston. 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.
SC — Okay, battery charge coming off, and last relay bust circuit breaker (garble)
CAPCOM — Okay, roger, we copy.
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)
CAPCOM — Good. That's a good idea, Tom.
SC — Houston, Apollo 10.
CAPCOM — 10, this is Houston. Go ahead.
sc — Okay, Joe, You got an update to the flight plan or anything?
CAPCOM — We don't have one right now, Tom, we've got some other little things we're going to pass up to you here in just a minute.
SC — Okay, we're all clear to sack out shortly.
CAPCOM — Good. We'll have it to you here in about 2 or 3 minutes.
SC — Okay.
CAPCOM — Okay, Apollo 10, this is Houston.
SC — Okay, Joe, ready to copy.

CAPCOM Okay, we've got about six or seven things here, Tom. First off, we notice that RHC number 2 power switch is still on and we'd like to have that off.

SC Okay, you want that off?

CAPCOM That's affirmative.

SC It's off.

CAPCOM Okay, the second thing we'd like to advise 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.

CAPCOM Okay, the next item, Tom; we'd like to have the LM CSM Delta P pressure, if you can get that for us please.

SC Stand by.

CAPCOM Okay.

SC We'll have that for you in a little bit, go ahead.

CAPCOM Okay. We're going to be watching this waste water H20 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.

END OF TAPE

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.

SC Okay. I believe I've got ---

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.

SC Okay.

SC 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?

SC That's where we have them.

CC Okay, very good.

SC One's in OMNI and one's in Bravo.

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.

SC Okay. Roger, we'll go ahead and 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.

SC Okay, Joe. pyro battery C is 36 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.

CC Okay - Okay, Tom, I guess the 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.

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.

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

SC Hey Joe, you're right about that 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.

SC Right.

CAPCOM On this chlorination, it looks like as per flight plan, we'd probably better go ahead and chlorinate.

SC Has the ... been coordinated?

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.

CAPCOM Oh I'm sorry. I thought we'd 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.

CAPCOM 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

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.

SC Hello Houston, Apollo 10.

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.

CAPCOM I know what you mean.

SC Okay, but you just want to leave it closed, right?

CAPCOM Right, John.

SC Okay.

SC Hello Houston, Apollo 10.

CAPCOM Roger, 10, go ahead.

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

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

SC Okay.

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.

END OF TAPE

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.

END OF TAPE

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.

SC Houston, Apollo 10, over.

CAPCOM Roger, go ahead 10.

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 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.

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.

SC Yea I was just wondering how much fuel it's going to take us to go zero them out and get all set up again.

CAPCOM Rog, I think fuel-wise you're just as 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.

SC Okay, we're just going to leave it like it is for awhile, okay.

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.

CAPCOM 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

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.

END OF TAPE

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- rum-rum-rum-rum, you know, for about 3 cycles.

CC 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 you later.

SC Alright.

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

PAO This is Apollo Control. 13 hours 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 second. The orange team of flight controllers headed up by 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

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.

END OF TAPE

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.

END OF TAPE

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

PAO This is Apollo Control. 17 hours 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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY,5/19/69,GET 18:03:30,CDT 0652, 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.

END OF TAPE

PAO This is Apollo Control at 19 hours 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.

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control, 21 hours, 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.

END OF TAPE

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.

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.

CC Roger. Good show. The only thing 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.

CC Roger; we copy all that.

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 Roger. On the flight plan Gene?

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

CC A pitch of 010 and a yaw of 000. Okay, for sets 3 and 4 -
SC Okay, what about the stars?
CC Okay, I'm giving you those now. Sets 3 and 4 for - for substitute nunki - N - U - N - K - I, 37 and far side.
SC Charlie, you cut off set the stars again; all I got was roll, pitch and yaw.
CC Okay, for sets 3 and 4 - Nunki instead of Antares, and we want the far side on Nunki.
SC Okay, is 1, 2 and 5 the same?
CC That's affirmative.
SC Okay - I got 20 - let's see - for P23, roll 078, pitch 010, and yaw all zeroes, and sets 3 and 4 changed to Nunki far star.
CC That's affirmative. And at 27 hours after the midcourse, we'll have an update for you on your P37 pads for 35 and 44 and 53 hours.
SC Alright.
CC And that's all we got this morning on the flight plan.
SC Okey doke; I think I got it all Charlie. We'll get that waste water dump in prior to 23:30 and we'll make a valiant effort on the dosimeters.
CC Roger, we copy. And as soon as you 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.
CC Roger. Stand by. Let me get this squared away here with Flight and we'll be with you in a minute.
SC Okay, we'll just wait for you to 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.
SC Yep Charlie. Roger. What happens 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.
CC Okay, fine Tom.
SC Charlie, it gives me the feeling like just a little minor pulse waves that big engine bell back there round just enough to vibrate until it damps out.
CC Okay, fine. Well we'll continue on then.

END OF TAPE

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.

CAPCOM Okay, fine. Well, we will continue 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.

CAPCOM Rog, John, 05027.

SC I believe that's right, Charlie.

CAPCOM Right.

SC These are very small numbers.

CAPCOM Roger. It's pretty early.

END OF TAPE

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 Man, we is just about ready for anything.

CAPCOM Roger. This is a news team of McCandless and 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.

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.

END OF TAPE

SC Hey, we'll keep fanning the peacock up here and you guys keep talking.

CAPCOM Okay, fine.

SC Hello, Houston. Apollo 10.

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.

CAPCOM Okay, I guess you were getting a 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.

SC Go ahead, Charlie.

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.

CAPCOM Okay, we'll - I don't quite understand 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.

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control at 22 hours 8 minutes. Charlie Duke is going to put a call to the crew here very shortly.

CAPCOM Apollo 10, Houston. Before you use any of your water to mix any of your food, would you hold off? We're trying to get this resolved, over.

SC Okay, Charlie, we thought the chlorine 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 -

END OF TAPE

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 Roger. Charlie, I'm going to go ahead and give you an O2 purge now.
CAPCOM Roger.
SC Okay, Charlie, that's why I asked 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?
CAPCOM That's a good question.
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.

END OF TAPE

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 notice 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.

SC Rog.

CAPCOM We will put the word out for 2330.

PAO This is Apollo Control. Astronomers 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.

END OF TAPE

PAO This is Apollo Control at 22 hours, 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.

SC Okay, I'll do it.

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?

CAPCOM Stand by. Apollo 10, this is 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.

SC Houston, this is 10.

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.

SC Delta 5 psi makes your voice a little higher, Charlie.

CAPCOM Oh, oh, that's right. I forgot. Are we having an encore or are you saving your next rendition for later on?

SC No, that's enough for one day.

CAPCOM Yes -

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control at 23 hours 20 minutes. Apollo 10 is 100 378 miles from the earth traveling 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.

SC It's too late now, Charlie, we've already gone through it.

CAPCOM Roger. Could you tell us where you drained 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.

END OF TAPE

PAO This is Apollo Control at 23 hours 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.

SC Houston, Apol10 10, over.

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?

CAPCOM That's affirmative, John. We would have 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.

CAPCOM Okay, at 22:30 GET your RCS totals were 92 percent across the board. We had an H2 total of 48. pounds, and an 02 total of 565 pounds.

SC Okay, Charlie, that's at 22:30?

CAPCOM Roger.

SC Houston, Apollo 10, over.

CAPCOM Go ahead.

SC Okay, I've got something out here now 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.

SC It's a long ways off.

CAPCOM Okay.

SC It doesn't even fill the center of the reticle. It goes about half the width of the reticle.

CAPCOM Roger.

SC The width of the line in the center of the reticle.

CAPCOM Roger, copy.

SC Shaft is 94-7 and trunnion is 38-7 right now.

CAPCOM Roger, we copy 10, we're copying down 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.

END OF TAPE

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.

PAO This is Apollo Control at 23 hours, 41 minutes. We're showing Apollo 10's distance from the earth now at 101,466 nautical miles. Velocity 5,414 feet per second. John Young reported he is tracking something 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 their booster. Flight Controllers here will attempt to verify 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.

SC Houston, this is 10. We're going 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.

SC Okay, well, I let it - I pushed it in and then I let it out. Would that account for it?

CAPCOM Stand by, I think so.

SC I didn't hold it in the full time. 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.

SC 10, Houston. Check looks okay to 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

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.

END OF TAPE

PAO This is Apollo Control at 23 hours, 53 minutes and we are in conversation with the crew.

SC Hello Houston, this is Charlie Brown.

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?

CC Roger, we'll have our morning report, when we first come on for you.

SC Yeah Charlie, we just can't tell you how great that sounded this morning; that was just tremendous.

CC I'm glad you enjoyed it.

SC Especially that horoscope - we wouldn't want these guys to do anything wrong.

CC 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?

SC I don't think you'd have a bit of 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.

CC Roger.
SC But you can't see them - you can't 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?
SC I can see a few out the left side 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.
SC Well, I can tell you from here that 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.
PAO That's John Young discussing the weather with Charlie Duke.

END OF TAPE

PAO This is Apollo Control at 24 hours 5 minutes. Distance is 102,742 -

CAPCOM Go ahead.

SC Hello, Houston.

CAPCOM Go ahead, 10.

SC I've been looking at the earth with 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.

CAPCOM Roger. Say again the position with respect to the earth, Gene.

SC Well, I've got the earth on the 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?

SC Well, it's perpendicular, the terminator got both sides, doesn't it? I'd say, it's from North to South Pole, it's toward the east.

CAPCOM Okay, that's what I was trying to 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?

SC Well, I can see it rotating and it's 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?

SC No.
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?
CAPCOM Stand by.
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.
SC Hello, Houston, Apollo 10.
CAPCOM Go ahead.
CAPCOM Hello, Apollo 10, Houston. We are reading you 5 by. Go ahead, Tom.
CAPCOM 10, Houston. Do you read?
SC Yes, now how do you read, Charlie?
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.
SC And we couldn't - John couldn't 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.

END OF TAPE

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.

END OF TAPE

SC Houston, Apollo 10. We're auto-
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 hop-
ping. 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.
SC That's what I was doing. I was
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?
CAPCOM I didn't get that number. Stand by.
John, the GUIDO's say any movement will be fine a degree or
so and then back is all we need.
SC Okay, I was moving it in both direc-
tions too.
CAPCOM Okay, fine. Good show.
SC About a degree -
CAPCOM Hello, 10, Houston. In this maneu-
ver to your P23 attitude, if you have to switch antennas
it'll take a command reset.
SC Okay.

END OF TAPE

PAO This is Apollo Control at 24 hours 48 minutes. We are in conversation with the crew again.

CAPCOM Hello 10, Houston. We'd like you to try 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.

CAPCOM 10, Houston, We've got the - some angles 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.

END OF TAPE

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.

SC Houston, I hate to admit this, but there aren't any stars that I can find right now to calibrate these optics on.

CAPCOM Roger, stand by.

SC It's got to do with the position of the 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 minutes. Apollo 10's distance now from earth 105 372 nautical miles, velocity 5 267 feet per second.

END OF TAPE

PAO This is Apollo Control at 25 hours, 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?

CAPCOM Stand by. 10, Houston. Leave the bias as it was yesterday.

CAPCOM 10, Houston. Did you copy on the trunnion? You can leave it the same as yesterday.

SC Rog, that's what I did.

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.

SC Yes, that's what I'm saying. Up here in the left seat it's the best mistake I've seen, Charlie.

CAPCOM Rog.

SC How about that, Charlie?

CAPCOM That's really beautiful.

SC It's unbelievable, as a matter of fact. They must have zeros (garble) on your matrix.

PAO This is Apollo Control at 25 hours, 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.

SC Yes, John's doing a great job. 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.

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.
SC Houston, did you get the first one on Nunki?
CAPCOM Roger, sure did.
SC Here's number 2.
CAPCOM Rog.

END OF TAPE

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.

SC We can make another one if you want to 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 P00 and accept we have a load for you, state vector, target load, and a PIPA bias update.

SC Okay, going sim 6 set to P00 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

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.
SC Okay, Houston, 10, I have one other 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.
SC Okay, thank you.
CAPCOM Roger.
CAPCOM 10, we've got your state vector and the 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.

END OF TAPE

PAO This is Apollo Control at 25 hours, 44 minutes. This midcourse burn -

CC 10, Houston; we got the load in now; 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. And 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?

CC We didn't get that number; hold on Gene. It'll take us a minute or two.

PAO At 25 hours, 46 minutes distance 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.

SC 1680 - roger. Long way.

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.

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.

end of tape

SC Hello, Houston, Apollo 10.
CAPCOM Go, 10.
SC And we've finally got a good view of the moon.
CAPCOM Hey, rog, that's - waxy crescent 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.
SC Nice to know where we're going.
CAPCOM Rog. Can you pick out any landmarks?
SC No, not from this distance. We've 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.
CAPCOM Okay, I keep cutting you guys out. I'm sorry.
SC It's amazing to see how much of it 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.
CAPCOM Yes, I guess it is pretty comforting. Well, we've got you pretty close. After this midcourse, we will have a perigee of about 58 miles.
SC But in relative ratio, it hasn't 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 Helio Apollo 10, Houston. Is the sun bothering you at this attitude?
SC Not yet. We're just about to finish 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.

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.

SC Hello, Houston, 10.

CAPCOM Go ahead, 10.

SC Okay, I can see the stars real good 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.

CAPCOM Rog. Boy, old Snoop really, when the sun is on the side, he must really block it all out.

SC Yes, and I've got the moon right up above the x-axis. It's a beautiful sight.

CAPCOM Rog. We envy you.

CAPCOM Hello, Charlie Brown, Houston. 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?

CAPCOM It was 32.1, 10.

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.

END OF TAPE

SC Coming up on 10 minutes. Mark, 10 minutes to the burn, and we're in burn attitude all squared away, Houston.

CAPCOM Roger.

CAPCOM Hello, Apollo 10, Houston. We'd 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.

CAPCOM Roger, we showed you load the proper 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.

SC We were all right on the seconds.

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, 30 minutes. Distance is now 110,000 miles. Velocity 5,099 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.

END OF TAPE

PAO - 30 seconds. Engine on; it looks 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.
SC There's 2/10.
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 us - one question. Could you guys feel the second bank coming 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

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.

END OF TAPE

CAPCOM Apollo 10, Houston.
SC Go ahead.
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.
CAPCOM Hello Apollo 10, Houston. We have some PTC angles for you and then some high gain angles and also we'd like for you to reinitiate battery B charge. Over.
SC Okay, stand by.
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.
CAPCOM Apollo 10, Houston, we'd like to hold off on the cycle in the fans and wait until our next scheduled time and see what happens.
SC Okay, Charlie, the light just went back out. I theorize that the heater may have come on and kicked it back within limits.
CAPCOM Roger, we concur.
SC And the caution and warning looks ...
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.

END OF TAPE

SC Roger, thank you.

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

SC Charlie, that's going to be a good attitude. We got the earth in the left window and the moon 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.

SC It looks like you've got a great 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.

SC Stand by.

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

CAPCOM 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 Roger. After you get through the 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 switches. Then wait 20 minutes, go to manual attitude pitch 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?

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 Okay, we're trying to get you set up in a stable position and all damped out and then initiate very carefully and slowly PTC and then open up deadband. We hope this will cut down on the thruster firing and keep you from bouncing off the side of the yaw 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 tube locked on to yours.
SC Okay, but really what we're trying to do here is just get the thing real stable before we start and then we're going to a 30 degree deadband just like before, right?
CAPCOM That's right.
SC Okay.
CAPCOM And down there on steps E and F you 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 yet. 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 yet. Let me check it out on the black and white monitor here. Okay, we're seeing the earth on the black and white. It's filling up about one third of the screen vertically. Looking good. Okay, you're on the color now and looking beautiful. Okay, we've got the North Pole over to the upper right hand corner - the right hand edge of our screen. Do you 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.

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

SC - what you see there is a little 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.

SC That's correct. A lot of it is 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.

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

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

CAPCOM Roger, it's coming very nicely 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.

SC Okay, right. Right there is about 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 Yes. How are the colors coming 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.

CAPCOM Roger, I'm having a little difficulty picking out the land masses down here today.

SC That's because of cloud cover then. 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.

CAPCOM Rog. We can pick up part of 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.

SC We're going to zoom it in again here. Show you a little bit closer. That's maximum zoom right now on the camera.

CAPCOM Roger.

SC It's a beautiful sight. We're sitting here and it's almost like Science Fiction looking back at us, Bruce.

CAPCOM Right. We can pick out the continents more clearly.

SC I'm voting for the world being 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.

SC It's in interior now.

CAPCOM Oh we can really see you working out down there.

SC Coming back to us again.

CAPCOM Beautiful.

SC And Tom's cutting on the F stop now a little bit.

CC Beautiful. What F stop are you 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 --

END OF TAPE

SC - plus 4 region - as though the ALC weren't quite picking up the insensity of the highlight.
SC Earth, we will not be able to see 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 space-craft if you like.
CC Okay, before you do that, would you open the lens up about 2 stops slowly and then stop it down fairly rapidly for us?
SC Okay, they are coming open now. (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.
CC Okay, we're picking up your trans-mission from inside now.
SC Houston, this is obviously our patch; how is it coming through in color?
CC Not so good really; it looks like 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.
CC Oh, that's beautiful.
SC We were gonna put some more things in, but we just ran out of time.
CC (loud laughter) Roger½ 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 Brown½ 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

SC gonna get a chance to do a little woofing here in the next couple days.
CC Roger. We notice the resemblance 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.
CC Roger; picking up Gene now; you've got rather strong back lighting from the window.
CC That's the spirit. You all enjoying 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.
CC No, it doesn't bother us. The 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.

END OF TAPE

SC One of our problems is trying to figure out which way is up and which way is down.
SC And it's beautiful one time you have your choice. If you don't like things right side up you can go upside 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.
SC it's the only way to fly.
SC Once you get going the cost for individual passenger mile becomes rather reasonable.
CAPCOM Roger, we copy.
SC I notice, boy, it sure picks up the sun's reflection and density no matter where you go. That little reflection is coming out of my window behind me.
CAPCOM That's all right. What F stop are you all using now?
SC We're on about 28 I believe here, wait 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.
CAPCOM Boy, with dynamics like that you guys ought 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.
SC That's perfect zero gravity there. Boy, 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.

CAPCOM Gene, could you move the camera around 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.

SC Yeah. I'll try here, Bruce, to get it away from some of that if I can.

CAPCOM Roger.

CAPCOM Oh, it's really looking good now. Beautiful color here.

SC Now we got three objects going.

CAPCOM This is a real testimonial to prove you were there, in case there were any doubters.

SC If you want to know what kind of men go to the moon, there's a good looking one right there. Could you believe it?

SC Some people still don't.

SC That's all right if you'll just send us some music.

CAPCOM Oh, you want music. Well we'll give you some music at the conclusion here.

SC Okay, we'll take you back outside now.

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.

SC Just wanted to send some thrust back to 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.

CAPCOM Oh it's just beautiful on the - the transients before it saturates there.

SC Okay, 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

SC I can. Is it looking okay?
CAPCOM Yes, you're doing a good job on holding it.
SC This is Apollo 10. On the monitor, it 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.
SC Yeah. I noticed it when we first turned it on it didn't have that until it really started to saturate.
CAPCOM All right. We saw those little bumps yesterday also.
SC It was at the end of the transmission 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

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?

CC I don't reckon that we will desert the MOCR here. I think there are a few people planning on sticking around, at least until you get into orbit.

SC Okay. That's really burning it 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.

CC Who am I suppose to tell, Tom?

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

END OF TAPE

CC -5499 minus 16511833 over.
SC Okay. TR plus 35 is 037305071 minus 16509435 Plus 44 is 046306695 minus 16509414 Plus 53 is 05530599 minus 16511833.
CC Roger. Can read back correct out.
SC Okay Bruce we've done the maneuver to the place where we disable all the jets we're going to wait here 20 minutes. Is that right?
CC That's affirmative Roger. All the jets in quad Charlie and delta.
CC Okay. You know we've got the AC jets 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

PAO This is Apollo Control at 27 hours, 50 minutes. The Apollo 10 crew is now reestablishing passive thermal control of PTC. That had been originally established yesterday to control the thermal environment of the spacecraft. Yesterday the roll rate in the passive thermal control was 1 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.

END OF TAPE

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.

END OF TAPE

PAC [illegible] Apollo Control at 2? hours, 59 minutes, and we're back in conversation with the crew.

CAPCOM Hello, Apollo 10, Houston. We'll have a ground handover at 28 hours even (ET.

SC Rog. Who are you handing us to, Charlie?

CAPCOM Say again. We're handing you over to Madrid.

SC Okay. That's a nice place. Will you start speaking Spanish to us now, Charlie?

CAPCOM I don't believe I could do that. How about buenos dias? Is that good enough?

SC Ah, si senor. Muy bien, gracias.

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.

SC That's all right, Charlie. You just keep talking grits. I understand it.

SC Charlie, not to sound corny or trite, but it really is like another world out here.

CAPCOM Say again, Gene.

SC I said at the expense of talking corny 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 -

showing a 5 degree deadband.

CAPCOM Roger. We wanted a - we want you to do us a 40 - a 30 degree deadband.

SC Stand by one. We'll get you squared away.

CAPCOM Gene, okay.

SC Okay, there's your 30 degree deadband, 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.

CAPCOM That's affirmative. We want you to go to CMC and pitch and yaw manual attitude and rate command.

SC Okay. And that's where we are.

CAPCOM Roger.

END OF TAPE

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.

END OF TAPE

APO This is Apollo Control at 28 hours, 20 minutes we're back in touch with the crew of Apollo 10.

SC Go ahead there, Houston.

CC Roger. We'd like to proceed with 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.

SC Understand. Proceed with the 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.

SC Roger. Hey Charlies, we're up 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.

CC We'll record that comment.

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

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.

END OF TAPE

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. Do 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.

END OF TAPE

PAO This is Apollo Control at 28 hours, 41 minutes and we're in conversation with the crew.

CAPCOM Do you have nap 1 on the 535 at this time?

SC Charlie, I'm going to high gain now.

CAPCOM Roger. I'm reading 5 by through the high gain, Gene.

SC 10, react when I went to react in high gain, I'm reading about minus 30 on my indicator - pitch indicator and 270 on yaw.

CAPCOM Roger, stand by.

SC I'm in a react mode now.

CAPCOM Roger, we copy on the high gain, 10. We'd like you to set your thumb wheels to the roll left indications 90 and a minus 40 and to configure your panel as shown in the Flight Plan with the addition of the tapes quarter to four.

SC That's the way we are right now.

CAPCOM Rog, good. 10, Houston. We're all configured and we think we'll be breaking lock here in a little while and then the next time around we should react and we'll see how that comes out.

SC Okay.

PAO This is Apollo Control at 28 hours, 47 minutes. Apollo 10's distance from the Earth now is 116,663 nautical miles. Velocity 4,891 feet per second.

END OF TAPE

PAO This is Apollo Control at 28 hours, 54 minutes and we are back in communication.
CC Hello, Apollo 10, Houston. Over.
SC Go ahead, Houston.
CC Roger. Reading you, 5 by.
CC Say it again, Gene.
SC Go ahead, Charlie.
CC Roger. Reading you 5 by. Looks like we locked up again on the react.
SC I guess so, but we never really seemed to lose lock for any great length of time for it to go back to those react angles. It has been wavering down between two-thirds and zero signal strength, but never seem to lose lock long enough for the react mode to put it back at the angles.
CC Roger. Stand by.
CC Hello, Apollo 10, Houston. Do you have us on the high gain?
SC That's affirm. High gain react mode.
CC Roger.
SC Looking right at you with the eyeball, Charlie, too. Right over Houston.
CC Roger.
SC Come out and smile and I will take your picture.
CC They won't let me out of this constant overcast here.
SC How long do you want to stay. Do you want to try this react mode continually again? Now it looks like we are picking up good strong strength at those angles.
CC Stand by.
CC 10, Houston. It looks like you switched to narrow beam it looks good. We'd like to try it one more time.
CC Okay.
SC Boy, we've got the world's brightest sunshine up here.
SC Roger. In which window?
CC It depends on where you are at the PTC mode.
CC Roger
SC I can see why they have all that thermal insulation on the lunar module. They need it.

CC Hello, Apollo 10, Houston.
SC Go ahead, Charlie.
CC Roger. I want to talk to John a little bit. I think we misled you on this PTC setup, John, last time. We would like to reinitiate this thing after this reacq test. And I would just like to run through this procedure again. On the 194 of the G&C checklist is good down through step 4. Then, we would like you to disable all the jets on quads c and d. Then wait 20 minutes again, then the manual attitude to PITCH and YAW to excel command. Then, make sure you enable all the jets and then initiate the desired roll rate with the procedures listed in the checklist. When you get the roll attained, then manual attitude roll to excel command and increase the dead band to the desired value on Page 193 and then manual attitude PITCH and YAW rate command. Over.
SC Roger. I figured you were going to say that, Charlie.
CC I don't get it. Excuse me. Little slow now.
SC No, that's all right. I understand what you are saying.
CC Roger.
CC It looked like to us that to get the roll rate started we didn't have all the jets and the thing coupled in on us and started - we got a PITCH and YAW out of it, also, instead of just pure roll.
SC Well, I would be right surprised to see if you can get a pure roll rate out of these things on account of the roll thrusters, they just ain't there.
CC Roger. Well the G&C guys say that with the damp doing it with the two jets, it ought to give us as close to a couple as we can get and they will admit that we get some PITCH and YAW, but we shouldn't get too much and then it should damp out for us.
SC Okay. What damps it out?
CC Roger. As I understand it, when you go back to PITCH and YAW rate command in the last step of the procedure, then we ought to damp those rates out.
SC But don't you make the dead bands big and everything.
CC Okay. Everybody is shaking - G&C is shaking his head no, that when you make the dead band big then you won't get any damping out until you hit the edge of the dead band, then it will bring you back in.

CC I guess you just have to accept those PITCH and YAWs when you start up the roll rate, if you do get it.

SC Okay.

CC Hello, Apollo 10, Houston. On this next reacq test, we would like you to check - monitor your PITCH and YAW gimbals on the S-band and see how close it comes to the gimbal and if it is listed on your card - your checklist.

SC Okay.

END OF TAPE

SC Charlie, let me run this by again and see if we got it straight now.

CAPCOM Roger.

SC Okay, we're going through the attitude at tight deadband. Now we're going to enter 5018, and we're going to disable C&D quads and wait 20 minutes, then we're going to enable all the jets that go to pitch and yaw rate command, and we're going to initiate a 3 tenths of a degree roll rate and excell command. All this time we are still a tight deadband, and then we're going to go to Y deadband. Is that correct?

CAPCOM That's negative, John. You - you wait 20 minutes - all that time to wait 20 minutes is too good. Then you go to manual attitude pitch and yaw to excell command. You enable all the jets, and then you let the dap start - stop - start the roll rate by doing the verb 21 901 inner and the verb 24 inner, and on the last enter, the thing ought to take off and roll, and when the roll is attained the manual attitude roll goes to excell command. Then you increase the deadband to the desired value and the manual attitude pitch and yaw to the right command. Over.

SC It looks to me like we ought to use gas.

CAPCOM Stand by. I know -

SC I'll try.

CAPCOM I cut you out. Go ahead.

PAO At 29 hours, 9 minutes Apollo 10's distance from the earth is 117 661 nautical miles, velocity 4 858 feet per second.

END OF TAPE

SC Hello Houston, Apollo 10.
CAPCOM 5 shot 10, go ahead.
SC Okay, we can read you now. We want to go over this step by step again because we think there is still one step that's out of sequence. We want to go through it after its finished the reacq mode here. Just go through the whole thing step by step and then we'll give it a go, okay.
CAPCOM Roger, 10. We copy.
SC Okay, Charlie. I've go a couple of points for you on that gimbal limit.
CAPCOM Okay, shoot.
SC Okay, you can plot them if you want. Pitch plus 60 and yaw 220. Pitch plus 60 and yaw 240 plus 260 and 270 and then pitch minus 10 and yaw 90. Pitch zero and yaw 120 and pitch zero and yaw 130. That gives you an idea of the ones I was able to plot how close we come to it.
CAPCOM Rog, thank you much, 10. We copy them all.
SC Okay, let me know how long you want us to stay in high gain.
CAPCOM Roger, stand by. Hello Apollo 10, Houston. We're ready to discuss the PTC setup if you guys are still go ahead.
SC Go, go, go.
CAPCOM 10, you want me to start out with the procedure as we have it or do you want to ask questions?
SC Why don't you run through it just one time and then let me write it all down and then I'll ask questions, okay.
CAPCOM Rog. Okay, on the set up your procedure on page - the G&N checklist 194 is good down to the - through step 4 on 5018 when the maneuver is complete to the PTC attitude. Then we'd like you to disable all jets on quads Charlie and Delta, wait 20 minutes then manual attitude pitch and yaw excel command. Then enable all jets. Then initiate the desired roll rate via the verb 24, noun 01 and the verb 24 inner. When role is obtained manual attitude roll to excel command. Then increase your deadband to the desired value and manual attitude, pitch and yaw to rate command. Over.
SC Okay, you went too fast on the last part there, Charlie. Okay, again you wanted to initiate the initial roll rate with verb 24, right?
CAPCOM That's affirmative. You know you set into the damp the 3 tenths via the verb 24, noun 01

CAPCOM and then the verb 24 and on the last inner on that sequence you get the - the dap will start the roll rate.

SC Okay. We set the decinal (garbled) disabled C and D jets, we wait 20 minutes, manual attitude, pitch and yaw execll command. Then we enable all jets to initiate the desired roll rate but we can't use the dap if the pitch and yaw are in excell command.

CAPCOM Roger, but - stand by. We got roll - we have roll in rate command and we want you to initiate the roll rate in using the dap. See if you have pitch and yaw -

SC Okay.

CAPCOM Okay.

SC Yea, well, my question is what keeps the roll from coming into pitch and yaw if you've got it in excell command?

CAPCOM Stand by.

END OF TAPE

CC Apollo 10, this is Houston. We'll admit that some rate will go to couple into pitch and yaw with pitch and yaw in the excel command when the low rate is initiated. But we feel that this is a procedure that will minimize that coupling over.

SC Well, I'll tell you Charlie. I really don't see a bit of difference between this and what he did when we set it up manually. We'd be doing the same things and you see where we're right now.

CC Roger.

SC We'll try it.

SC We'll give it one go and see how it works out and follow us right through it. Okay.

CC Roger.

SC Okay one question Charlie. Do you want to go to the attitude and tight dead band, is that not correct?

CC That's affirmative. On the VERB 48 we select .5 degree dead band.

SC Okay.

CC 10, Houston. We're dumping your tape. We'd like, when we finish the dump - we'd like for you to go to OMNI bravo and also one flight plan update, at 2855 delete the closing of the 02 vac jon mainly A and B breakers.

SC Here we've got it Charlie.

CC Roger.

SC When are you going to be done with the dump?

CC Stand by. Ecomm say in a minute Gene.

SC Okay.

CC Hello Apollo 10, Houston. We have the dump completed select OMNI bravo, please.

SC Okay. Go on OMNI bravo.

SC Hey Charlie. When we get the desired roll rate then go manual attitude in roll to excel command, what's the third step in there?

CC Rog. That's affirmative. Manual attitude roll to excel command then you can increase your dead band to the desired value and then put the manual attitude pitch and yaw to rate command. Over.

SC Okay.

SC Okay. The attitude we have C&D jets disabled.

CC Roger.

SC We started the clock to wait the 20 minutes.

CC Roger. Copy. Our last time out to the 20 minutes we had rates down to less than a thousandth degree.

SC Yeah but Charlie, here's the thing. We'll go ahead and do this but what happened was that when Tom initiated a 3 10th degree per second roll rate with

SC - pitch and yaw, in excel command, and it coupled, I don't see how, we're right up against a dead band in about 20 minutes or however long it was.

CC Roger. Did you enable all the jets at that time when you started that roll rate? Over.

SC Nope, okay, I'm not sure. We'll go right down through the procedure.

CC Roger.

END OF TAPE

DEAD AIR

END OF TAPE

PAO This is Apollo Control at 29 hours, 55 minutes. Apollo 10 now at a distance of 119,805 nautical miles from Earth and velocity continuing to decrease very slowly. Present speed is 4,790 feet per second. We've completed a change of shift here in Mission Control. Flight Director Milton Windler has come on to replace Glynn Lunney. Our Capsule Communicator will continue to be Charlie Duke. Milton Windler has gone around the room, reviewed the status of the Mission to this point with all of his Flight Controllers, finds everything in good condition. We've had some conversation with the spacecraft since our last report relating to the test to set up a 3 tenths of a second rate in roll for passive thermal control. This is one of two modes being tested on this mission for passive thermal control. Up until now the spacecraft has been rotating very slowly at the rate of about 1 revolution per hour. That rate will be speeded up to about 3 revolutions per hour. We'll pick up the taped conversation that we have and stand by for any live communications with the spacecraft.

SC Okay, Houston. Apollo 10. We're going to go ahead and load the DSKY. As you can see and will not hit the enter until 20 minutes has elapsed.

CAPCOM Roger 10, we copy. 10, Houston. Before you hit the final enter, we'd like you to hold off right where we are until we can get some verification on what this will do to us by just standing here.

SC Okay. Okay, we're down to the last step and we'll hold off.

CAPCOM Roger, we copy. Stand by, Tom.

SC Rog, Charlie. Okay Charlie, when we get to 20 minutes you mean you don't want us to keep on going. Houston, Apollo 10.

CAPCOM Rog, go ahead, 10.

SC When we get to 20 minutes you do not wish us to proceed with the test?

CAPCOM Negative, 10. That wasn't my intention. We're discussing with the G&C now. When you did the verb 24, noun 01 enter it set up a rate of some sort that I'm trying to get explained to me right now and I'll be back with you in just a moment. At the end of the 20 minutes you can proceed on. If you stand by I'll have an explanation for you, over.

SC I don't see much rates here.

CAPCOM Roger, we - they're very small, 10. We saw something on the downlink. It's damping out now. When you get to 20 minutes, you can proceed.

SC Roger. Okay, coming up on 20 minutes. Going to put the manual attitude, pitch, and yaw to excel command. Mark 20 minutes. Manual attitude, pitch and yaw to excel command and all jets are coming on and able.

CAPCOM Roger.

SC Okay, are you ready for us to rehit this final enter to set up the roll rate?

CAPCOM Stand by.

SC Okay, we're standing by. Houston, Apollo 10.

CAPCOM Go ahead, 10.

SC Okay, if that roll jet fires it's going to couple into the other axis before we even get started on this thing.

CAPCOM Roger, we're having a little discussion down here. We'll be back with you in 5 seconds or so. Hold on.

SC Okay. And it just fired.

CAPCOM Roger, you can enter.

SC It's entered and there it goes.

CAPCOM Roger.

SC Okay, roll's going to excel command.

CAPCOM Roger.

SC And we're going to put the deadband to wide now, affirmative?

CAPCOM That's affirmative, to 30 degrees.

SC Okay down. Manual attitude, pitch, and yaw now going to rate command.

CAPCOM That's affirmative, 10 and I think we're finally in configuration. Let's see what happens.

SC Okay, we'll find out (garbled)

CAPCOM Hello Apollo 10, Houston. After your comments on manual attitude, pitch and yaw to rate command you faded out, Tom. Say again what you had.

SC Okay, that was the last step on the total sequence. And honestly, the only difference between this one and the last one was that this time the dap did it and last time we did it. Roll rate.

CAPCOM Roger, if - one point here. We couldn't, since we didn't have the high bit rate we couldn't tell but if you had not - did not enable all the jets, then when you started the roll manually in excel command, then it would only fire one jet and that would couple due to the CG problems with the LM on board it would couple into pitch and yaw. And we feel that that's what's happened but we weren't able to verify that due to the telemetry.

SC Okay, well I think it's a good theory but that - that isn't what happened because we had the same procedure for the last one except with the exception that we replaced the dap with the stick and throttle guy.

CAPCOM Roger, we - stand by. We'll see if we can come up with an answer but I doubt it, John. There's a lot of disagreement here on this.

SC Okay, well that's very interesting. We'll watch it.

CAPCOM Rog.

SC Houston, Apollo 10.

CAPCOM Go ahead Apollo 10.

SC Okay, at 30 hours, we have a LM CM delta P for you as per flight plan. It is now reading 1.05 psi.

CAPCOM Roger, copy, Tom.

SC Roger. This thing is really tight over there.

CAPCOM Rog, we agree. 10, this is Houston. There is no need to reinitiate the CM purge now.

SC Roger.

PAO This is Apollo Control. During that last transmission you heard the crew remark that the delta P - the difference in pressure between the Command Module and the Lunar Module now reads 1.05 pounds per square inch. What that means is that the Lunar Module, which following Earth Orbit Insertion, had a cabin pressure equal to that of the Command Module but has not been repressurized, in the mean time has lost a very small amount of its cabin atmosphere. This in turn is an indication of a very tight cabin. At the present time, Apollo 10 is at a distance of 120,271 nautical miles from Earth and traveling at a speed of 4,775 feet per second. The change of shift Press Conference is scheduled to begin shortly and during the Press Conference we will record any further conversation with the spacecraft and play that back following the Press Conference. This is Apollo Control at 30 hours, 5 minutes.

END OF TAPE

PAO This is Apollo Control at 31 hours, 5 minutes. Apollo 10 is at a distance of 123,024 nautical miles from Earth. Current velocity is 4,690 feet per second. During the Press Conference we accumulated several minutes of tape conversation with the crew. Included in that conversation was a report on the passive thermal control rotation mode that the spacecraft has been put into and an assesment that at first appearances it seemed to be working quite well. We'll play back the tape for you and then stand by for any further conversation.

CAPCOM Hello Apollo 10, Houston.

SC 10, over.

CAPCOM Roger, we'll have a station handover in about 3 minutes and 45 seconds. We're going back to Goldstone it looks like.

SC Roger.

CAPCOM 10, Houston. Go ahead.

SC Roger, just wanted to check with you on the (garbled). One thing we're doing here with all this spare time we're getting out our Lunar Operation Cards and Charts and going through the whole thing. Just having a skull session and we'll be doing this for about the next 2 days. Just reviewing the stuff. Just like going through a simulation.

CAPCOM Roger, Apollo 10. We copy.

SC We might have a few questions coming down.

CAPCOM Roger, we'll be standing by with all the guys, Tom and we finally located our backup set and we'll be doing the same thing.

SC Okay, real fine, Charlie.

CAPCOM Any other requests you guys got. Looks like the Earth is - PTC beginning to work. We see it going off in pitch and yaw but it is not coupling and going to one - spirling out to one edge of the deadband. If it's going back and forth between pitch and yaw well within the deadband.

SC Yea, looks like it's going to work.

CAPCOM Well, we hope so after all that - we apologize to you guys for not being straight on the procedure.

SC Well, I still don't know why the other one wouldn't have worked either.

CAPCOM We can't answer it either, John, really. It's just one of these black magic ones, I guess. We've had a shift change down here. Too bad you guys have to work 24 hours a day up there. We got the maroon team it is that's on now.

SC Okay, Charlie. Take it easy.
CAPCOM Rog.
SC We'll see you tomorrow.
CAPCOM We'll see you tomorrow.
SC Okay, one thing about working 24 hours a day, we've got a beautiful view up here.
CAPCOM Yea, it's well worth it, Tom. We're real envious.
SC Yea, one thing of interest to note. You know the total clouds we described to you on TV.
CAPCOM Yea.
SC From our angle now, it looks like the whole Northern quarter of the whole globe is completely socked in there and again the United States is what really stands out, part of Mexico. We can see the Gulf Coast from here real well. Right through the hatch window.
CAPCOM Rog, everybody who just came in from outside said it's still clear so that's a good description.
SC We'll see you tomorrow, Charlie.
CAPCOM Rog, good night. Apollo 10, this is Houston, over.
SC Hey, Bruce. We just want you to eye over night on the SPS oxidizer all its pressure. I've seen it, oh after yesterday's burn drop maybe about 5 psi and after today's burn it appears like it's slowly dropping. It may be a temperature effect, but I'd like you to keep an eye on it over night.
CAPCOM Roger, we'll keep a watch on it.
SC Okay.
CAPCOM Apollo 10, this is Houston, over.
SC Go ahead, Houston.
CAPCOM Roger, this oxidizer tank ullage pressure decrease was also noticed on 8. We saw some of it last night. The explaination is that the oxidizer is absorbing the helium that is present in the tank causing the pressure to decrease. When it becomes saturated with helium then things will remain static in this respect for the rest of the mission, over.
SC Fantastic there, Bruce. Okay, I'm just glad to hear those kind of answers because I've been looking here at it too for a couple of days.
CAPCOM Roger, we will keep an eye on it though for you.
SC Okay, that makes me feel a little bit warmer.
CAPCOM Apollo 10, this is Houston. We've

CAPCOM been having some difficulties with the data storage equipment under ground command here so we've started the tape, we'd like to record a few minutes worth of random data and then try dumping it back down to verify our system here.

SC Okay, I have the gray up here so I guess it's on okay, Bruce.

CAPCOM Roger.

PAO All continues to be quiet from the spacecraft. At this time the crew is scheduled to be having their evening meal. As you've heard we've had a change of Capsule Communicators here in Mission Control. Astronaut Bruce McCandless has relieved astronaut Charlie Duke as the spacecraft communicator. At 31 hours, 14 minutes into the flight of Apollo 10, this is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 31 hours, 37 minutes. Our spacecraft now at a distance of 124,441 nautical miles from Earth and the velocity is 4,647 feet per second. CAPCOM Bruce McCandless has just put in a call to the crew and we're in conversation with the spacecraft at this time. We'll pick that up for you at the beginning.

CAPCOM Apollo 10, this is Houston, over.

SC Go ahead, Houston.

CAPCOM Roger 10, if you're through with your meal we've got some conversation for John regarding the 23 settings, over.

SC Okay, go ahead.

CAPCOM Okay, the noise in the data is about 8 to 12 arc seconds which is considered to be very good. The nominal noise on the sextant with zero errors is 10 arc seconds so it looks like you're doing things perfectly on the sighting. With respect to the delta H, we got two different values. The one from yesterday implied using a reference at 33 to 34 kilometers. The setting from today implied delta H of 13 to 14 kilometers. We suspect that the background light during todays settings was higher than yesterday. This would probably cause difficulty in sensing the upper threshold at the same places yesterday. You intend to pick out a brighter and perhaps lower horizon locator. The problem is not serious. It shouldn't cause any concern but we'd like some comments from you specifically if you can compare the lighting background for today's settings with the background that you had yesterday and can you determine where this light, as it was brighter, came from, over.

SC Well, there was a distinct horizon yesterday and I was marking on the upper most, I really don't know where, it looked like the - actually there was a pretty definite, defined limit that I was seeing there yesterday. And today I didn't see that. It just looked like there was no -

CAPCOM Roger, you also made a comment about losing a star in the horizon. Can you elaborate on that?

SC You know sometimes the auto tracking, tracks both the star and the - it puts the optics down on the Earth. The mark on the horizon, you bring it up to the horizon and mark on it. Well, when it doesn't - puts it down on the Earth, it was so bright today that I couldn't see any of the stars. Everytime it would be too bright to see the stars, so I don't really know how you would do under those kind of conditions. It would be difficult to do - star landmark I believe.

CAPCOM Roger, we copy. Thank you.
SC Hello Houston, Apollo 10.
CAPCOM Apollo 10, this is Houston, go ahead, over.
SC Roger, Bruce could you make a check and see if it was tested on the ground prior to flight for this little hand held centrifuge to separate air from water? Yes we have a strange phemenon, the bubbles go to the bottom of the bag.
CAPCOM Roger, it may take us a few minutes to track down the party responsible for the testing on this but we'll check it out.
SC I wish you would. It's utterly phemonenal. What happens is that we start off with a bag full of water and bubbles. Little bitty bubbles and we end up with a bag full of water and great big bubbles. But there is no way to separate the bubbles from the water, that I can see.
CAPCOM Did you try spinning it the other way.
SC Laughing. Dutifully, yes we have.
CAPCOM Roger, we'll look into it.

END OF TAPE

CC Apollo 10, this is Houston. Over.
SC Go ahead.
CC Roger, 10. At this time, we'd like you to select H2 tank 2 heaters to off.
SC We're doing this in order to avoid giving you a master caution warning light during this sleep period, if at all possible. Over.
SC H2 tank 2 heater is off.
CC Roger.

END OF TAPE

PAO This is Apollo Control at 32 hours, 5 minutes. Capsule communicator, Bruce McCandless, has just put in a call to the crew and we're in a conversation with them now.

CAPCOM Apollo 10, this is Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger, 10. To facilitate our DSE dump, we'd like to try high gain antenna acquisition once without disturbing the PDC - PTC. If we can't do it, we'll wait until tomorrow. Your procedure for high gain antenna pointing to verb 64 in the checklist starts out with a verb 37 enter. Do not do the verb 37 enter. Just start right out with the verb 64 enter so that we don't disturb the PTC. Over.

SC Rog. You want us to put the verb 64 to DSKY. Is that right?

CAPCOM Roger. And acquire with high gain antenna.

SC Okay, in the theory they probably don't disturb the PTC.

CAPCOM Roger.

SC Houston, do you have high gain now?

CAPCOM Negative 10, not yet.

SC Houston, we have it now.

CAPCOM Roger. We confirm high gain antenna acquisition, and I got a few other notes for you prior to your sleep period. Are you ready to copy?

SC Wait one.

SC Go ahead, Bruce.

CAPCOM Roger. We'll be using omni antennas tonight during PTC, and this will be omni BRAVO. We'd like to request that in setting up your com modes for this evening you insure that the S-band normal mode voice switch is off, and use down voice backup if you need to contact us during the night. There will be a waste water dump after GET of 45 hours tomorrow. We'll give you an exact time tomorrow. We show rotational hand controler number 2 direct power to be on. We'd like it turned off. The general consumable analysis for this point in the mission is that you're in good shape. If you need any specific numbers, well we can supply them. Your PTC mode looks good so far, in fact the angular excursions in pitch and yaw which is built up to about 7 or 8 degrees a half an hour or so ago it seemed to adapt down and decrease on the order of 4 1/2 or 5 degrees at the present time. We'd like you to report after you finish chlorinating the potable water connects and we'd remind you to leave the portable tank inlet valve open. Over.

SC Okay. I think we got the chlorination information, and we'll let you know. And if we use omnis - I

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

END OF TAPE

SC ---I imagine it will be a 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?
CC That's affirmative.
SC Okay.
CC Apollo 10, this is Houston. We 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

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.

END OF TAPE

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.

CC Roger. Thank you.

CC 10, Houston. Radio check. Over

SC Roger. Reading you loud and clear OMNI bravo. How do you read?

CC Roger. We are reading you fine.

SC Okay. We are in down voice backup.

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.

SC Go ahead, Houston.

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 Okay. Purposes flyby by SPS and G&N 99353 plus 093 minus 021070442027 plus 02256 glad 00327 minus 05263 roll is 102351 and 017 now 44 NA. Are you 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.

CC Roger. Out.

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.

END OF TAPE

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.

CAPCOM Apollo 10, this is Houston. About all we've got left before you close up for the evening is your crew status report, over.

SC Okay, Bruce. We're just changing out the canisters at this time.

CAPCOM Roger.

SC We'll be with you in a minute. Okay, 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 -

PAO Here in Mission Control at the 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.

CAPCOM Apollo 10, this is Houston, over.

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.

SC And after that we're going to co-operate 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.

SC Okay Bruce, sure will.

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.

END OF TAPE

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.

END OF TAPE

PAO This is Mission Control, now 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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

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

PAO This is Apollo Control 39 hours 01 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.

END OF TAPE

PAO This is Apollo Control, 40 hours and 1 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 say 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.

END OF TAPE

PAO This is Apollo Control. 41 hours 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.

END OF TAPE

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 spacecraft stack. Its been some delay in getting this installed properly and its estimated the roll out will begin at 9:00 Central Daylight Time. And at 42 houus 2 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

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.

END OF TAPE

SC Houston, Apollo 10 transmitting on regular S-band omni voice. How do you read? Over.

CAPCOM Reveille, reveille, all hands muster on the flight deck for calisthenics. How do you read?

SC Loud and clear. We had a little trouble routing up all hands this morning.

CAPCOM Well, 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.

END OF TAPE

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.

SC Yeah, sorta looks like we've got a hard day of EGC. That thing didn't fire thrusters once last night; my hats off to you; that's great.

CC You were right; we were gonna mention 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.

END OF TAPE

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.

SC Roger. I better go down to the end compartment and hold reveille.

CAPCOM Say again, please.

SC I said I've got to go back to the aft compartment and hold a little reveille.

SC Hello, Houston, Apollo 10.

CAPCOM Good morning, Apollo 10, this is Houston. How do you read?

SC Loud and clear. Hey, this is really a great place to sleep on the way to the moon, I'll tell you.

CAPCOM Well, we let you sleep in a little bit. Have a good rest?

SC Yes, about 9 hours solid.

SC Good morning, Jack, how are you?

CAPCOM Good morning, great shape. Understand you are a little slow on reveille this morning.

SC Yes, if we had known you were down there, we probably would have heard the bugle.

CAPCOM I expected to hear your feet collectively 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.

CAPCOM And in addition, your data on both command module RCS rings remains the same; your leak rate on ring number 1 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 fixing breakfast, might as well listen to the news.

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 -

END OF TAPE

CAPCOM Millions of people throughout the world 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.

CAPCOM Roger, there will be another time.

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.

CAPCOM Roger, we're standing by, and how is that 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 -

END OF TAPE

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.

SC Jack, right now I'm looking at all 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.

END OF TAPE

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.

END OF TAPE

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.

SC Houston, Apollo 10. We're ready to copy the consumables update when they are available.

SC Hello, Houston, Apollo 10.

CAPCOM Apollo 10, this is Houston. Here 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.

END OF TAPE

CC - roll; over.
SC Roger on the consumables, and we'll switch over to IC roll instead of BD roll.
CC Houston; roger. And this is 4 percent above the flight plan RCS.
SC Roger. Houston, Apollo 10.
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.
PAO This is Apollo Control. Stafford's 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 air-to-ground loop for any further conversation from Apollo 10.

END OF TAPE

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.

END OF TAPE

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 air-to-ground to Apollo 10.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0813, GET 4424 146/1

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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, 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.

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control. Let's join 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?
SC I'm reading it. It just went out now. It came on just as I cycled - turned the fans on and now it's out. I'm ready to copy that flight plan update.
CAPCOM Roger, here's the flight plan update. 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 5145 we have a waste water dump due.
SC That's 5145?
CAPCOM That's affirmative, and we're standing by for your crew status report and your PRD readings.
SC Okay, we will give you the dosimeter 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.

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.

END OF TAPE

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.

SC We're ACCEPT in P00.

CAPCOM Roger, and I have a couple more items on the flight plan update when you're ready to copy.

SC Go 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.

END OF TAPE

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

END OF TAPE

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

ALL DEAD AIR -

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

CAPCOM Apollo 10, Houston. Go ahead.
SC Roger. I don't know if the GUIDO is watching us or not on the high bit rate or whatever, but what I'm doing here is taking advantage of the PTC to check this celestial - to check the planet option. I've already got Jupiter and you can recognize it because of its moons. And now I'm looking for Mars.
CAPCOM Roger, we copy. Thank you.
SC Tom has the earth at his window, and that's the reason for the program ..., and got Mars vector in there and it's open by Tom's window.
CAPCOM Houston, roger.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 45:24, CDT 0913 156/1

DEAD AIR

END OF TAPE

PAO The Atlantic area should have widely scattered showers for the next two days. The outlook for the end of the mission area is satisfactory. End of the mission area is 15 degrees, 7 minutes south latitude by 165 degrees west longitude, in the southwest Pacific some 345 nautical miles due east of Pago Pago, Tutuila, in American Samoa. Continuing to monitor air-ground with Apollo 10. Circuit is still live.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 45:32, CDT 0921 158/1

SC Okay, Houston, we've just checked Saturn and it's definitely recognizable because of the ring's course and it's pretty close to the sun for a data point I think, but it's easily visible.

CAPCOM Roger 10, we copy.

SC Houston, this is 10. We can't do that optics calibration without stopping out PTC. Over.

CAPCOM Roger, stand by.

SC I guess everybody knew that, didn't they? We did the realign while we still had PTC and it seemed to work okay.

CAPCOM Stand by one, please.

SC Houston, Apollo 10.

CAPCOM Apollo 10, Houston, we thought we were going to come out of PTC to do the P52. There is no need at this time to do the second calibration. We can do that when you come out of PTC for the television later on in the flight plan. Over.

SC Hello Houston, Apollo 10.

CAPCOM Go ahead, 10.

SC Okay, Jack, just for a minute to look ahead in the flight plan, are we still planning the fuel cell H2 purge after 46 hours?

CAPCOM Houston. That's affirmative.

SC Okay, we'll go ahead and get the H2 purge line heaters on as called in the flight plan.

CAPCOM Roger, we copy, and did you copy my last about the second calibration? Over.

END OF TAPE

CAPCOM Apollo 10, Houston.
SC Go ahead, over.
CAPCOM Roger. Did you copy our last about the -
SC Go ahead, Houston.
CAPCOM Roger, 10, this is Houston. Did you copy our last about doing the sextant calibration when we come out of PTC for the television as opposed to doing it now? Over.
SC Negative, we didn't. I was just fixing to get Arcturus and do it on Arcturus. Looks like that would be a good one.
CAPCOM Roger. We had -
SC That's fine with us. There's no sense in - we'd kill two birds with one stone that way.
CAPCOM Roger. We prefer not to interfere with the PTC. This is not - the sextant calibration is not time critical; however, we thought that you would come out of PTC to do the P52, so let's hold off on the sextant calibration until the TV pass, over.

END OF TAPE

CAPCOM Hello, Apollo 10, Houston. Over.
SC Good morning there.
CAPCOM Good morning, you guys. Your friendly Black Team's coming back on duty for the daylight hours and we got one thing for you. When you did call up the P52, John, you collapsed your deadband. We'd like you to widen it again out to the 30 degrees, over. When you get through the 52.
SC Okay, what we did was - yes, well, we just left the pitch and yaw in accel command and with this thing about coupling, it doesn't, you know, it doesn't make any difference, Charlie. But we're going to establish that deadband back when we get done.
CAPCOM Roger.
SC Hello, Houston, this is 10. As a result of that P52, sort of on the fly so to speak, the auto optics is not positioning the stars right in the center of the reticle. They're off - they're within the lines but they're not in the center like they usually are, so I'd like to do another realine where we stop for TV or whatever. and we can get that optics calibration at the same time.
CAPCOM Roger, John. I'm pretty sure we'll concur. Stand by. Yes, 10 -
SC I don't - I think it's good - It's within the R and M lines on the sextant which is really pretty good. In fact, it's putting all the planet options inside the sextant field of view with no problem at all. We checked three options, Jupiter, Mars and Saturn, and it put them all right in there.
CAPCOM Roger, we copy. We can concur if you want to do the P52 - another one - down after the TV when we do the sextant cal. You can do it if you want to, over.
SC Okay, and I think this looks okay. I just want to verify from the torquing angle.
CAPCOM Roger. Can you give us your torquing angles and your star angle differences there?
SC Okay, Charlie. We used star 36 and 44. The star angle difference was four balls one. The torquing angles X was plus 0043 -

END OF TAPE

SC -- + 00431 Y - 00366 Z - 00063.
CAPCOM Rog, thank you much, 10. We had data dropout during the time. We couldn't copy it, thank you.
SC Roger.
CAPCOM Was that about 4544, thereabouts, Tom?
SC Okay, it was 450630.
CAPCOM Rog.
SC What it was Charlie, was I did the first P52 using the start, then checked the planet options without actually using those alignments.
CAPCOM Okay, 10, I copied.
SC So the actual realign was kind of early this morning.
CAPCOM Rog, before we came in. Thank you.
PAO This is Apollo Control at 45 hours 49 minutes. The Black Team of Flight Controllers led by Flight Director Glynn Lunney has gone on duty in the Mission Operations Control Room. The CapCom is Charlie Duke. Apollo 10's distance from earth 158,780 nautical miles; velocity 3,747 feet per second. We will continue to stay up live.
CAPCOM Hello, Apollo 10, Houston. We're ready to configure the cryo H2 heaters, if you're standing by.
SC Okay, Charlie, all set.
CAPCOM Roger. On my mark, it's - stand by. Roger, 10, on my mark it's tank 1 heaters off, tank 2 heaters auto. Stand by, mark.

END OF TAPE

SC - stand by; mark.
CC Hello Apollo 10; Houston; over.
SC Go ahead Charlie.
CC Roger. I think we lost you with the antenna switch there Geno; did you copy the mark on the heater switch?
SC No - I'm sure we did lose you. Go ahead.
CC Roger. On my mark - H2, tank 1 heaters to OFF, and tank 2 heaters to AUTO. Stand by. Mark.
SC Okay.
SC Hey you got it. H2 tank 1 is OFF, and H2 tank 2 is AUTO.
CC Roger. And the E comms say that during the day here you probably can expect some master alarms from this configuration, due to the heaters, but it should set us up for the night so we won't - they won't wake you up tonight with the same things. We'll go back to normal -
SC Okay, that's great.
CC And we'll go back to normal configuration for pre-sleep.
SC Roger. Houston - we reinitialized these dead bands quite a ways from our 90 degree point, and we probably ought to reinitialize them when we get back around 90 degrees; do you concur?
CC Stand by.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 45:57, CDT 0946 163/1

CAPCOM Hello Apollo 10, Houston. On reestablishing the dead band when you went to ACCEL command you really didn't hurt a thing. When you selected the VERB 37 you collapsed it, but we notice that you've increased your dead band and it's still established plus or minus 30 degrees around 90 degrees on the pitch, so we're still in good shape. Over.

SC Roger, Charlie, sounds real good. Thank you.

CAPCOM Roger.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0951, GET 4602 164/1

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END OF TAPE

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

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

SC Houston, the H2 purge is complete. The line heater is OFF.

CC Roger; copy. Hey, Geno, did you guys have any trouble with the canister changes?

SC No, we're about to make one right now; I don't think we've had any trouble; stand by.

CC Roger - the only reason I asked was I remember during the C squared, F squared, we had some sticky ones and was wondering how it was going.

SC Thus far, Charlie none have stuck.

CC Roger.

PAO This is Apollo Control at 46 hours, 23 minutes. Apollo 10 has just passed the 160 000 mile mark. Current distance 160 014 nautical miles; velocity 3719 feet 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

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 -

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 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.

END OF TAPE

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.

CC It was the Span people that came up with -

SC As a matter of fact -

CC I was going to say it was the Stan 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.

SC Yeah, it feels good in here, and looks 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.

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

SC Alrighty. Houston, Apollo 10.

CC Go ahead 10.

SC Okay, just to reiterate, the only 2 anomalies we've seen on the whole spacecraft, and by-and-large, 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

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.

CAPCOM Rog, we'll pass it on, Tom and we're 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.

SC Okay, we will give them just a short, 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.

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

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

SC Yes, Africa is great. It looks like velvet. All of Europe, Soviet Union, all down through the 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.

SC Okay. I was just about to ask you, in 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.

CAPCOM Well -

SC Maybe our gage reading is just low.

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

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.

SC Okay.

SC Charlie, would you - you got 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.

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.

SC Okay, I have to wait a couple of minutes for the world to come around.

CAPCOM Roger.

CAPCOM Hello, 10, this is Houston. Madrid is standing by. You can turn on the tube any time.

CAPCOM Hello, Apollo 10, you are barely readable. We request - if you read me, we request you go narrow beam.

SC Charlie, we are narrow beam. How do you read?

CAPCOM Rog. Reading you 5 by now, Gene. Tom's conversation was unreadable, however.

SC Okay, well, we've been narrow beam ever 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 transmis- we 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.

SC TV is on in the interior now until we 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.

PAO Madrid reports a fairly good signal now. 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 Roger. Madrid is copying.

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.

END OF TAPE

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 now.
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 -
SC Go ahead Houston, this is 10.
CAPCOM Roger, Geno. Our signal strength is down about 10 db. We'd like you to go high gain to medium width and then back to narrow. Over.
SC Okay, it's medium now and I'll go 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.
CAPCOM Roger, we'd like to - wish we were 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.
SC Where better can you give an astronomical 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.
CAPCOM Roger, 10, we're still having a problem locking up so we'd like to have you go to wide beam for 30 seconds and back to narrow. Over.

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 eye 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.
CAPCOM Roger, we hope so. We'd like for you to go back narrow beam width now, 10.
SC Roger, we're back in there, Charlie.
CAPCOM Roger, and we're getting a great 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.
SC Okay, the earth ought to be coming through my window here in a minute, Charlie. Stand by.
CAPCOM Roger, we're standing by.
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.
SC Okay, we're all right now, though, 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.

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

END OF TAPE

SC ... Madrid.
CC Roger - we're beginning to lose the high gain 10; we're going to OMNI.
SC Okay; that's a shame, cause it sure is pretty.
CC 10, Houston, if you'll go to manual on the high-gain and we'll switch to OMNI.
SC You're there.
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?
CC Stand by.
CC It'll be approximately 10 minutes 10.
SC Okay, we'll note that and let us know as soon as we have high-gain lock; we should be able to get it out the hatch window and my side window.
CC Roger, and we'll come up with some 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.

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.

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?

CC Say again 10, I cut you out.

SC I said I was betting that Fido has an LOI one pad for us right now.

CC He's working on it; we got some; Fido says he's got your SIVB about 3970 miles away.

SC Well that must be it then, that I saw, 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.

END OF TAPE

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 -
SC We should be locked on narrow now on high beam - high gain.
CAPCOM Roger, and our signal strength looks 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

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 Roger. Yesterday when we were looking 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.

SC It's a purplish-bluish tinge and we 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.

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.

SC We'll show you a new law of physics 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?

SC Yes, how come you were late? Charlie, 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.

SC Well, all you can make out is it 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 seems to be clear. In France, Marseilles is open. It looks 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 -

END OF TAPE

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 Roger.

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.

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.

CAPCOM Rog.

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.

SC Hello, Houston, are you reading us?

CAPCOM Rog, reading you 5 by now.

SC Okay, 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.

END OF TAPE

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

END OF TAPE

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.

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 -

END OF TAPE

CAPCOM - it's about 4,000 miles. I guess the thing is about the same plane that you all are. FIDO says you will have an update on your range -

SC Yes, we see it.

CAPCOM Go ahead.

SC We see it fairly regularly, if we look for it as we rotate through this PTC.

CAPCOM FIDO will have an update on the range in about an hour ro so for you.

SC Okay.

PAO That is Gene Cernan in conversation with Charlie Duke.

SC Hello, Houston, Apollo 10.

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.

CAPCOM Roger, we copy. We're working on the S-IVB location vector for you. Do you want us to send that up when we get it?

SC Yes, go ahead.

CAPCOM Okay. Copy redundant component check.

SC Okay, Houston, if you are watching, we are going to do the main regulator checks here.

CAPCOM Apollo 10, this is Houston. Can you hold off on the component check for a minute or so until we get the high gain acquisition?

SC Okay.

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

SC Houston, 10, how do you read?
CAPCOM Roger, loud and clear and ready to proceed with the redundant component check.
SC Okay.
CAPCOM Apollo 10, this is Houston. We copy 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.
SC Hey, Bruce, how are things back there on the home front?
CAPCOM Oh, they are pretty good. Everybody is watching you all via TV and the newspapers and things are going along nicely here.
SC What about the home-home fronts?
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.
PAO The 2 Barbaras are Mrs. Barbara Cernan and Mrs. Barbara Young.
SC Houston, 10, if you are satisfied 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.

END OF TAPE

PAO This is Apollo Control at 48 hours, 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.

END OF TAPE

CDT

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.

END OF TAPE

PAO This is Apollo Control at 49 hours 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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

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.

CAPCOM Rog, we copy.

SC This is about the best view I think I've had -

CAPCOM 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, copy. It was beautiful when

we came to work this morning outside. I don't know what it's looking like now though. Hold on.

SC You don't even have to go out. I'll tell you.

CAPCOM Okay, everybody - the front row standing here says it looks beautiful outside.

SC We'll have it coming around here in the other window in just a few minutes.

CAPCOM Roger. 10, can you comment on any other -

SC (garble) you guys like it down here -

CAPCOM Say again, Gene, I cut you out.

SC Go ahead, Charlie.

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.

SC We'll take a look at it as she comes through the window over here.

CAPCOM Rog.

END OF TAPE

SC Hello Houston, this is Apollo 10.
CAPCOM Go ahead, 10.
SC Hey, Charlie, (garbled)
SC Hello Houston, Apollo 10.
CAPCOM Roger, 10, go ahead. We switched antennas on you, 10, and you were cut out, Tom, right when you began your conversation. Go ahead.
SC Okay. We're working through the Goldstone now, right?
CAPCOM 10, you're breaking up. Can you stand by about a minute until we get a better signal?
SC Okay.
CAPCOM Apollo 10, Houston, how do you read now?
SC Roger, read you loud and clear. How me?
CAPCOM You're about 3 to 4 by, 10. Go ahead, I think we can read you now.
SC Yes, okay, Charlie. If you have a good 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.
CAPCOM Roger, stand by, we're at Goldstone 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.
SC Okay, and your inlets from Florida all 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 Roger. They'll appreciate that.
SC I can definitely see up in the Great Lakes region now.

CAPCOM Roger.

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.

END OF TAPE

CC - you can probably get it. Stand by - the E-comms are shaking their heads "no" on that - try 51, 10.

SC That's 51, okay. Tell them I'm gonna leave them in a little bit to see if we can do a little better than that.

CC 10, we don't have the lines in from 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.

SC Okay. Okay, there's solid lock on 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

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

CC Roger.

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.

SC Roger, the color of the torpical rain 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)

CC Roger, can you pick out the Amazon River?

SC No - there's, I can't pick out the 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?

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

CC Roger.

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

END OF TAPE

SC As we say adios, we disappear behind our hatch window now. We will see you later.
CAPCOM Roger.
SC Cut it.
SC That vox worked okay, I guess.
CAPCOM Hey, 10, that vox was perfect. None of the words were clipped or anything. It was like talking to you in the same room, 10. It was really great.
SC Okay, that's the first time I guess 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.
SC ... coverage on the earth at all. 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.

CAPCOM Yes, like maybe all of it.

PAO That's John Young giving that description.

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 -

END OF TAPE

SC see the river but you can sort of see 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.

CAPCOM Roger. Sounds like a spectacular sight. Wish we had had a stowaway up there with you.

SC Hey, you know, you almost did until they wrote it in the OCP to get Joe Engle out of here.

CAPCOM Yes.

SC It's also very interesting to watch 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.

SC And I agree now with John. 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.

CAPCOM Hey, you guys are a long way away. We've got you at about 170 000 miles, little bit more than that right now.

SC 170, okay.

CAPCOM Roger, you're still below, if the drawing 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.

CAPCOM Hey, we're trying to get some angles - 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

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

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

CAPCOM Hello, Apollo 10, Houston, over.
SC Go ahead, Charlie.
CAPCOM Rog, John. Looking here ahead in 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 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.

END OF TAPE

SC Okay, we're turning to it, Charlie.
CAPCOM 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 DOI 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.
SC I think we ought to talk that one over.
CAPCOM Roger.
SC Let 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?

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 Okay -

END OF TAPE

CAPCOM 10, Houston, we are back. Do you read me?
SC Okay, how do you read now, Charlie?
CAPCOM You're 5 by, Tom. Look, we aren't just suggesting this. We feel like it's more of a real-time 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.
SC Yes, that's just exactly what we were coming 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.
CAPCOM Roger, we agree.
SC Let's make us leave it up to real time.
CAPCOM Roger, we agree 100 percent. We're with you.
SC All right. fine.
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.
CAPCOM Roger, we'll let you know, John.
SC Charlie, would you pass on the word to Christopher C. that we're saving all this fuel so we can get him some good landmark tracking.
CAPCOM Roger, we sure will, and Tom, I talked to 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.
SC Okay, thank you.
SC How can you be a ham when you're just trying to show that the world's round?
CAPCOM It's the interior shots that they were 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?

CAPCOM Roger, it's up to you guys whatever you 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.

CAPCOM Roger, I take really not much credit for that.

SC You might have to clear that with Gordo and Ed.

CAPCOM Roger. Ed's sitting here right now grinning 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.

SC Now we're trying to spare him. 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.

PAO Ed is Ed Mitchell, the Lunar Module Pilot 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.

SC Okay, sounds good to us. I don't think 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.

END OF TAPE

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.
SC It's the only reason I mentioned 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.

END OF TAPE

SC Houston; Apollo 10.
CC Go ahead 10.
SC Okay, Charlie, looks like we finally drifted out of deadband and fired a couple of thrusters.
CC Roger; we see you at 30 on the pitch in here.
SC Okay, Charlie, does it look like we should go back and start all over again or just continue on as is?
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.
SC Okay - it looks like; I guess we've 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.

END OF TAPE

SC Hello, Houston. Apollo 10.
CC Roger. Go ahead 10.
SC Roger. We seem to be waltzing off here against that yaw.
CC Roger. Copy. Stand by. We'll look at it. We might want you to start up again. Stand by.
SC Houston, Apollo 10. I don't know if whether you can read our telemetry 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.
CC Roger 10. We copy. Stand by just 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.
CC Hello 10, Houston.
SC Go.
CC Roger. You can discontinue 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.
CC 10, Houston. In this attitude, we'll 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.

END OF TAPE

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?

CC Stand by. We are discussing that right now, 10.

SC We've been doing it with that wide deadband. If we turn them off now, we'll just go all over the place I guess.

CC Roger. It's your choice. We'd 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.

SC Yes. There is a beautiful view out of the left side window.

CC Roger.

SC Couldn't ask for any better. 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.

CC Okay. We're standing by.

SC Okay. John is all set to start on the P52. Do you want the waste water dumped first?

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

CC stand by 2 seconds. Go ahead you can do your P52.
SC Okay.
CC 10, Houston. We should be able 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.
CC 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

CAPCOM 10, we copy your torquing angles and your star angle difference.

SC Houston, Apollo 10. Do you want us to go ahead with the calibration test at this time?

CAPCOM That's affirmative. We recommend star 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 verb 086987 there with us?

CAPCOM Roger. We - stand by. We copy it.

END OF TAPE

CAPCOM 10, Houston. We're satisfied that the trunnion calibration is looking good to us. You needn't do any more.

PAO This is Apollo Control.

SC I believe that 89992 is probably the best number. These are right on the edge of the sextant. It's about to disappear out of it.

CAPCOM Roger, 10. We copy. It's looking 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.

SC Roger, I'll load - unload the 89992.

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?

CAPCOM 10, we're through with your update. 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.

SC The reason for the delay in between 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.

CAPCOM Roger, we agree.

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.

SC Roger, we are synced. Rog, did you allow for the speed of light there, Charlie?

CAPCOM Yes sir. I got it one second early so you should have had it.

SC Okay.

CAPCOM Me and the retro can really count -

SC (garbled) You've taken lots of lessons from (garbled) there huh.

CAPCOM Rog.

SC Okay, I've got the G&C clock going 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.

CAPCOM Here comes the water dump.

SC Houston, we're dumping.

CAPCOM Roger, copied.

SC Houston, Apollo 10. Has any of the telescopes been able to see the water dump yet?

CAPCOM We haven't got word back on that 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.

END OF TAPE

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.

SC Houston, Apollo 10. Did you 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.

END OF TAPE

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.

SC See that, Charlie, and (garble)

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.

SC I just called up 687, isn't the 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.

SC please don't tell me it is not 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.

END OF TAPE

PAO This is Apollo Control at 52 hours 57 minutes. Apollo 10 is 173,614 nautical miles from the earth. Traveling at a velocity of 3,429 feet per second.

SC Hello Houston. Apollo 10.

CC Apollo 10, Houston. Go.

SC Okay, John was asking earlier 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?

SC Great. This is just as great as you said it was man.

CC Kind of neat, isn't it.

SC Man. Yeah.

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 EK

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.

CC Okay. Here we go. It says Step 1. Fill the bag to approximately 1/2 full of water using the water dispenser.
SC Did that.
CC Okay.
SC Did that.
CC I copied. You did that. 2nd step. Squeeze the bag (laugh) Stand by.
SC Yeah, I was afraid it was going to start about that smart.
SC It's a pretty complicated mechanism 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.
SC Quite a theory there. We'll give you a real term evaluation right now, Charlie.
CC Okay. We can't wait for the TV. That's all with the only help we've got for the whole thing. Over.
SC Just wait for the TV, Charlie.
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

CAPCOM Hey, did you guys try just using one of the plain fruit juice bags to separate it out. How - did you ever try that?

SC Yea, and Don the water stays with the air. The bubbles condense from a thousand bubbles into 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.

CAPCOM Roger, maybe we've discovered something here.

SC That's all relative.

CAPCOM 10, it may be that the surface tension on the inside of that bag is enough to keep the water from flowing through that constriction very well.

SC Well at the end of the centrifuge turns, the big bubble is right in the bottom, quite a ways away from the constriction.

CAPCOM Roger.

SC It won't condense all the bubbles but the one or two big ones.

CAPCOM Yea. Looks like the swing handle's on the wrong end of the bag, huh.

SC The swing handle is on the right end, but the valve is on the wrong end.

CAPCOM Well, which ever.

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.

CAPCOM Go ahead. We're hearing you.

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 mid-west are very clear except for that cloud and there's some

SC clouds which appear to be over, oh 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.

CAPCOM Roger, 10. We're looking at a weather map that was just brought in and we cast our vote with you Gene, 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.

SC Yea, and I think you'll see that big swirl of clouds Tom was talking about up Alaska way.

CAPCOM Roger, there's a -

SC Charlie, you asked Tom about the 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.

SC That's affirm. That's going to be 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.

END OF TAPE

CC 10, through the monocular or through the sextant, were you able to distinguish the features around say the San Francisco Bay area?
SC Let me take a look, Charlie.
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 we are. Right smack underneath us - right in the center of 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.
PAO We are standing by for a TV feed 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.

SC Hello, Houston. This is Apollo 10. You ought to be receiving something now.
CC Stand by. It is not coming in here yet.
SC Okay. We are just starting.
CC Roger. Will it be exterior shots, Jim?
SC Negative. We'll just start interior right away and then take you outside.
CC Roger.
SC And then we'll bring you back 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.
CC Roger. We will. The networks and all are configured for this, so we are standing by.
SC Let us know when you are getting 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.
CC Okay, we are seeing your patch now in black and white. Be just a few more seconds.
PAO Color coming now.
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.
SC And we'd like to say hello from 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.

END OF TAPE

CC Okay.
SC Negative. Stand by one.Got a little technical difficulties here.
CC We are still getting the color, 10.
SC Inaudible
CC Okay. Go ahead.
SC Here's hello the 5 of us from on Apollo 10, here's Tom Stafford.
CC He's a beautiful Tom Stafford there. He's in living color.
SC John Young.
CC We've got John. He's a little dark down there now, with the lights not on him, but we can tell it's John with his chin strap loose.
SC And yours truly, Gene Cernan.
CC Roger, we got you Gene. The 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.
SC Okay. That's the three of us. Here's the other two on Apollo 10, the friendly Charlie Brown and our ever loving companion Snoopy.
CC Roger. We got it coming in now. 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.
SC How's that?
CC That's fine. It looks a little 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

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.

CC Roger.

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.

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?

SC Okay. Let us know when it is a little better.

CC Okay, it was a little -- there 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 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

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 ----

END OF TAPE

SC You'll see a funny could pattern that 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.

CAPCOM Roger. That's nearly apparent to us. 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.

SC There it is, Charlie. That ought to be good.

CAPCOM Okay. It just came in on the black and white. We'll see it in just a second. Okay, now we see what you're talking about. Looks like an inverted view almost.

SC Now you ought to be - all right, now you ought to be able to see that - that V area I was talking about better too.

CAPCOM Roger. It's coming in a lot better, Gene.

SC Okay. If you got a pretty good view of the outside, we'll take you back inside for one last quick minute.

CAPCOM Thanks a lot, 10, for that view,. It's real good. We'll be standing by for the water bag trick.

SC Okay. We'll take you back inside here.

SC I'll take care of it.

SC Question for today - who is that?

CAPCOM It looks like John Young with four sets of eyes in it. No, two sets of eyes.

SC There you go.

CAPCOM Let's call it four eyes.

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.

SC Roger. Don't adjust your set. It's in

SC black and white.
CAPCOM Roger.
CAPCOM We can read on the -
SC If you want to know where we're going - 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 got. This is the area around landing site 2.
CAPCOM Roger. Could you open it up a little 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 -
SC The moral of the story is, John - the 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.
SC ... we'll eventually - that's the area 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.
SC That's one advantage we have. 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

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 picture there, Gene. Why don't you - there you go, you pushed him out of the. You got - you got center stage now.
SC What a ham.
CAPCOM You want to see me push, watch what happens.
SC That's called one finger power.
CAPCOM Rog.
SC Okay, this is Apollo 10 signing off. 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.
CAPCOM Rog. We'd appreciate that.
SC The bag is full of - half full of bubbly 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.
CAPCOM 10, try spinning a little bit harder, 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.

END OF TAPE

CAPCOM Hey, that's a good - you're really 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.
SC And it's in the bottom. Charlie, about the only thing we get by spinning them is making the little bubbles into a big one and it stays in the bottom.
CAPCOM Roger, is there any water left in the top of the bag, 10?
SC No, there's no water in the top of the bag. All the water's out. We have tried it with semi-filled 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.
CAPCOM Roger. Have you tried it filling up - filling the bag both top and the bottom of the bag and then spinning it?
SC Yea, we tried that too.
CAPCOM Well it doesn't look like it works 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.
SC And he'll rotate the camera over 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.

CAPCOM Thank you much, 10. We appreciated the show. It was very nice. We'll see you tomorrow.

SC Okay, and tomorrow we should be around the Moon.

CAPCOM Rog. 10, Houston.

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 -

SC You sure like to talk a lot, Charlie.

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 you, 10. The interior shots in some of the darker portions 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

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 -

END OF TAPE

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.

SC Houston, this is Apollo 10. Is that procedure still good for today. When we disable the C&D jets, do we disable the C&D - the C roll jets also?

CAPCOM Stand by. That's affirmative, 10. We want you to disable all jets on quads C and D.

SC Roger. They're disabled.

CAPCOM Copy.

SC Okay, the clock is started, then after 20 minutes, we'll go ahead (garble) the station.

CAPCOM Rog.

END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 1807 GET 5418 207/1

DEAD AIR

SC This is Apollo 10. Now we're 20 minutes after having started the PTC entry exercise.

CC Roger 10. What do you want?

CC Roger. We'd like you to disable 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 Say 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?

CC Stand by. We'll have some word 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.

END OF TAPE

SC Hello, Houston. This is 10.
CC Roger 10, Houston. Go ahead.
SC Looks like we're going to be losing high gain track here in a minute.
CC That's affirm. We like for you to go OMNI, 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.
SC Okay, Joe, thruster in. Thank you.
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

END OF TAPE

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.

END OF TAPE

PAO This is Apollo Control at 55 hours, 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.

SC 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?

SC 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?

SC No. We feel the moon pulling just a little bit harder right now Joe.

CC Okay. Something's wrong.

SC You say we're not in the lunar sphere yet?

CC Not quite.

SC You forgot we can pull from here too.

CC Okay.

CC You guys are really throwing down out there. You don't want to throw it out now.

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.

SC Go ahead, Houston. Apollo 10.
CC Roger, John, we'd like to switch your hydrogen suit down a little bit and go to sleep configuration. Tank 1 to auto and tank 2 off.
SC Tank 1 heater to Auto, tank 2 off.
CC That's for a fact.

END OF TAPE

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.

END OF TAPE

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 02 bands right now, and I think the private conversation handles the crew status report this time.

CAPCOM Roger. Roger. I've got a couple of 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

CAPCOM it again.
SC Hello, Houston, Apollo 10.
CAPCOM Go ahead, Apollo 10.
SC Hello, Houston, This is Apollo 10. Over.
CAPCOM Apollo 10, this is Houston. Reading you loud and clear. Go ahead.
GOLDSTONE Apollo 10, stand by. Goldstone having communication problems with Houston.
SC Roger.
MCC Goldstone, Houston. Contact voice check.
GOLDSTONE Goldstone,
MCC Roger, how do you read?
GOLDSTONE Loud and clear.
MCC Roger. Stand by. I'll send you 3 short keys.
GOLDSTONE Rog. G's are GO.
MCC Roger. Thank you.
CAPCOM Apollo 10, this is Houston. How do you read now?
SC Okay. We're reading you loud and clear now.
CAPCOM Roger. Apollo 10. We lost our link out of the site. Where were we when you lost me?
SC We were talking, ED. I don't know how 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.
CAPCOM Apollo 10, this is Houston. Reading you loud and clear. Go ahead.
GOLDSTONE Apollo 10. Stand by. Goldstone having 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.
CAPCOM Roger. John, we'll get to work on that. 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

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.

END OF TAPE

CAPCOM Apollo 10, Houston.
SC Go ahead, Joe.
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.
SC Roger, that's what we understood there, Joe, over.
CAPCOM Okay, fine. I thought he said midcourse LOI, I wanted to clarify that.
SC Boy, that's a fantastic target until retro. That's great.
CAPCOM We'll agree there.
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.
PAO During that last conversation with 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 because of the deletion of the midcourse correction 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 tonight.

END OF TAPE

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 personal report. Spacecraft Commander Stafford summarized 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.

END OF TAPE

PAO This is Apollo Control at 58 hours, 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 tomorrow 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 Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 59 hours 51 minutes. Apollo 10 now 186 thousand 851 nautical miles from earth. The velocity of the spacecraft if 3,181 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 use it all. Here in mission control we've continued monitoring 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.

END OF TAPE

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.

END OF TAPE

APOLLO 10 COMMENTARY, 5/21/69, CDT 0139, GET 61:50 220/1

PAO This is Apollo Control at 61 hours 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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

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, and Spain. At 66 hours 3 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

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

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.

END OF TAPE

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 that time. Some numbers have been generated here in the 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 11 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.

END OF TAPE

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.

CC Apollo 10, Houston. Sounds like we're ready for a Navy drill on the Flight Direct.

SC Its good music.

CC How it'd come through this time John?

SC Its loud and clear. Its beautiful. Sounds like we've got stereo.

END OF TAPE

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 air-to-ground communications that come from Apollo 10.

END OF TAPE

SC Houston, this is 10. The world doesn't look very much littler than it did yesterday.

CAPCOM 10, roger. I bet you the moon looks a little bigger though.

SC Hello, Houston, Apollo 10. How do you read? Hello, Houston, Apollo 10. How do you read?

CAPCOM Apollo 10, Houston. Go ahead, over.

SC Hello, Houston, Apollo 10. How do you read?

CAPCOM Apollo 10, Houston. Loud and clear. How me? Over.

END OF TAPE

CAPCOM Apollo 10, Apollo 10, Houston. Over.
COMM TECH I'm keying.
CAPCOM Apollo 10, Houston, how do you read?
CAPCOM Apollo 10, Houston. How do you read? Over.
SC Hello, Houston, Apollo 10. How do you 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.
SC Madrid COMM TECH, Apollo 10. Is Houston 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.
CAPCOM Good, glad to hear it. You ought to with 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.
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.

END OF TAPE

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 Okay, do you want to -

CAPCOM 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 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

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 -

END OF TAPE

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.

SC That's affirm. We checked it. It is in AUTO; it is in AUTO.

CAPCOM Roger, thank you.

END OF TAPE

PAO This is Apollo Control. Apparently 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.

SC 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

CAPCOM William Forster has resigned his 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 Maroons, 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?

CAPCOM Let's see, C,h,i, Chicago, Chicago.
SC Oh, yes. I was looking at it yesterday. I saw them out there practicing. Speaking of Chicago, did the Cubs play ball?
CAPCOM I don't have them listed, Gene. Do they play ball?
SC Oh, you're really bad, you're really 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?

END OF TAPE

CAPCOM - well, we were just about to ask you how you slept. I know John, he probably slept on his 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.

CAPCOM Okay, they probably didn't keep you 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.

SC Houston, Apollo 10, over.

CAPCOM Go ahead, Apollo 10.

SC Roger. We decided maybe we can get around that delay problem by trying to remember to stay over after conversation. It hadn't worked too well so far, over.

CAPCOM Apollo 10, this is Houston. Let's get back to that in a couple of minutes. We're getting a lot of background noise.

PAO This is Apollo Control. Spacecraft 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 position, the noise will drop off.

END OF TAPE

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 Roger. Over.

SC That's "Roger out", Jack. Over.

SC Houston, this is Apollo 10. Over.

CAPCOM Apollo 10, Houston, stand by one, please.

END OF TAPE

CC Apollo 10, Houston. Go ahead; over.
SC Roger. I was just wondering what the - are we gonna knock off the PGC to do the realine to the new REFSMMAT; I guess we are. I would like to get an attitude to go to which will avoid that desire to get gimbal angles - use gimbal lock, program alarm if possible.
CC Roger; stand by.
SC The second thing is does this change in our flight time at the moon affect its lunar umbra before we get to the moon? Over.
CC Apollo 10, Houston. You'll 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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

SC Houston, Apollo 10. What time do you want us to do the realign? As outlined in the flight plan?

CAPCOM 10, this is Houston. According to the 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.

SC Houston, Apollo 10 on that attitude 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.

END OF TAPE

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.

SC Okay, it's PC + 2, is that correct?

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.

END OF TAPE

CC Roger 10; that's affirmative. Another Maneuver pad follows; over.

SC 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

CAPCOM - roll is NA, pitch 027, and the rest is NA, over.

SC Okay, Jack. TEI + 4 is SPS G&N, 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.

CAPCOM Apollo 10, Houston. Go ahead, over.

SC I'm ready to copy, over.

CAPCOM Roger. I just have some new dope on the TV attitude. TV attitude is the same as your inertial 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.

SC The attitude will stay the same, 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.

SC Roger, Jack, (garble).

CAPCOM Apollo 10, Houston. I didn't copy your last transmission. Say again, please.

SC It's no hurry.

CAPCOM Apollo 10, Houston. Tom, I'm not reading you, but I'm reading John okay. Could you have a relay there, please?

SC Okay, we're squared away, Jack. 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

SC Houston, Houston, this is 10, we are commencing the redundant component check. We will check the main regulators here in a second.

CAPCOM Roger, 10, we copy.

SC coming at you, Houston.

CAPCOM Say again, 10.

SC Well, if you didn't get it, that was a main regulator being checked there.

CAPCOM Roger, understand, 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.

SC How about that.

SC Have you got any?

SC No.

SC Boy, Houston, you all think of everything. I never would have considered that.

END OF TAPE

SC Houston; Apollo 10, how do you read me now Jack?

CC I'm reading you loud and clear now Tom.

SC Okay, I didn't have the mikes up close enough I guess, so that was the main trouble; over.

CC Roger, you're real good now Tom.

END OF TAPE

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.

END OF TAPE

SC Houston, this is Apollo 10. Good 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.

SC We thought we could hear you changing 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?

SC Jack's already asked that.

CAPCOM Okay, I'll get it from Jack then.

SC I thought you guys go through a formal change of the command ceremony down there every morning.

CAPCOM Say again. Over.

SC The ECS redundant component check 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

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

END OF TAPE

SC Hello, Houston. Houston, this is 10. How do read in high gain?

CAPCOM 10, Houston. Reading you about 4 by in the high gain.

SC Okay, we're now AUTO high gain narrow at the present time.

CAPCOM Roger, 10. You're just a little scratchy.

SC Okay.

END OF TAPE

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 -

END OF TAPE

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.

SC We don't see the sun. We don't see it.

PAO This is Apollo Control at 72 hours, 6 minutes. We are standing by waiting for some word on what will be attempted for this next TV transmission at the regularly scheduled time, as you heard Charlie Duke pass up to the crew. Goldstone will not be able to acquire with the 210 foot antenna; 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 -

END OF TAPE

CAPCOM Roger, 10. We're just barely reading you, Tom. We are looking at your display, 29 for perilune of 2906. You are very scratchy, 10, at least Tom is. Almost unreadable.

SC Houston, this is 10. Radio check, over.

CAPCOM Roger, you are 5 by, John, over.

SC Roger.

SC Roger, Charlie. How do you read me now? Over.

CAPCOM Roger, Tom. You are 5 by, over.

SC Okay, real fine.

END OF TAPE

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 to Goldstone. Goldstone as yet has not received your signal and we'll let you know, over.

SC Okay, we've got a beautiful picture on our monitor this morning.

CAPCOM Good show, 10, over.

PAO A few minutes ago at 72 hours, 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?

CAPCOM Roger, 10, we'll do that. Stand 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.

SC Houston, while you're waiting for 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 peri-cynthion 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.

SC We can take P21 to about the middle 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

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.

SC Roger.

END OF TAPE

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.
CAPCOM Rog, we copy.
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.
SC That's affirmative. Distance from the earth; distance to the moon; and our present velocity.
CAPCOM Roger, 10. Tom, you are 5 by now. 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

SC Hello, Houston. The tube is on right now.

CAPCOM Roger, 10. Stand by; we don't have a picture yet, over.

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.

END OF TAPE

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 Rog.

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.

PAO Picture coming up now.

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?

SC Right, you can see the South Atlantic 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 -

END OF TAPE

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.

SC 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

CAPCOM pretty dark due to the bright background. That's a lot better there, 10. Over.

END OF TAPE

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.

END OF TAPE

CAPCOM - you're coming real great, over.
SC Okay.
SC And the overhead hatch window there.
CAPCOM 10, Houston. We see some streaks 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.
SC We're not very good at this camera 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.
SC He's the star of the cast because he gets all the good light down there.
CAPCOM Rog. There's old John's smiling 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.
SC Yes, this is the best working part 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.
SC One on the bottom of the sextant 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.

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.

CAPCOM Your friendly FIDOs will bet on it.

SC - some navigating now.

SC Yes, I guess we are too, aren't we?

CAPCOM Rog.

SC I never doubted them anyway. I 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?

SC The stars are 180 out of the position they were before.

SC That's one thing about this environment, 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 210-foot dish looks at the earth from outside, okay?

CAPCOM Roger, 10, we are standing by, over.

END OF TAPE

SC Does it look any different upside down, Charlie?

CAPCOM The stars are 180 out of the position they were before.

SC That's one thing about this environment. If you don't like it just turn upside down.

CAPCOM Roger, 10.

SC Okay, Charlie, we'll terminate this pass with one quick look outside and see how the 210-foot dish looks at the earth from outside, okay?

CAPCOM Roger, 10, we're standing by, over.

SC Charlie, it's definitely getting a little darker outside.

CAPCOM Roger, 10, that's good news, over.

SC Looks like we're right on trajectory then. Okay, here's another look at the earth through the 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 Tunisia. Again, it's awful hard to see Spain because Spain is 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. I believe it's probably from the earth over on the left side.

CAPCOM Roger, 10. We think it might be earthshine. We have an update to your LOI 1 burn card, over.

SC Stand by a second.

CAPCOM Roger, no hurry on this.

PAO That was Gene Cernan describing 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

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.

CAPCOM Hello, 10, Houston. We just had a handover to Goldstone. Do you read now, over.

SC Oh, yes, I thought that was us. 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, okay. And what is that update you have for us?

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 1 first, Charlie.

CAPCOM Roger, LOS is 0754825, 0755252, 0762258, over.

SC Okay, I've got map update rev 1 0754825, 0755252, and 0762258.

CAPCOM Rog, that was a good read back, over.

SC Okay, and go ahead with your update on the preliminary LOI.

CAPCOM Roger, it's on your burn card that 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 011, 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.

CAPCOM That's affirmative, over.

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

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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 73:06, CDT 1255 263/1

DEAD AIR

END OF TAPE

PAO This is Apollo Control at 73 hours 26 minutes. Apollo 10 is 6,863 nautical miles from the moon; velocity 4,464 feet per second. We are in conversation with Apollo 10 now.

SC - the LM is bright as day, courtesy earthshine.

CAPCOM Roger, understand you are getting a lot of earthshine up there, 10, over.

SC Rog.

CAPCOM Apollo 10, this is Houston. It looks like you're drifting into the limit on the high gain antenna. You will be handling the omnis on board; looks like you are coming up on omni delta for max signal strength, over.

SC Roger.

SC Houston, Apollo 10. As you can see, we're - made just a couple of pulses, but we're slowly drifting over to our LOI 1 attitude.

CAPCOM This is Houston. Roger, out.

SC Hello, Houston. This is 10.

CAPCOM Go ahead, 10, over.

SC Okay, reservicing is started and I am at the point where I've got the waterflow on. I'll keep it on for 2 minutes.

CAPCOM Roger, we copy.

CAPCOM Hello, 10, Houston. We show 2 minutes on the water. It looks like you got some water into the evaporator. We suggest you turn it off, over.

SC All right, understand you don't want me to activate it at this time. I just went to auto on the steam pressure and waterflow.

CAPCOM Rog, that's the correct procedure. Over.

SC Okay, that's where we are right now and I'm reading about 0.23 on my steam pressure.

CAPCOM Roger, we copy, over.

SC And down below, about 44 degrees. About 44 degrees on the glycol evap out temp.

CAPCOM Roger.

PAO Gene Cernan is reservcing the primary evaporator. That's the one that dried out in earth orbit on launch day.

COMTECH Goldstone, Houston Comm Tech, net 1.

GOLDSTONE Goldstone.

COMTECH Roger. I am receiving an echo.

GOLDSTONE Negative, I'm not receiving an echo.

COMTECH I am. When I transmit, I am getting an echo. Meet me on net 2.

GOLDSTONE Roger.

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.

SC Roger. I'll - for the P27 update, I'll go into CMC accept now.

CAPCOM Roger.

SC You are in accept, over.

CAPCOM Roger, 10, out.

SC Okay, Charlie, I'm ready for the 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.

SC Houston, this is 10 with the read-back.

CAPCOM Go ahead.

SC LOI 1 is SPS G&N 52554 + 095 - 017 075555331 - 29138 - 05612 - 0299735523034201692 + 0059529824 554297521621463 94, 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.

SC Houston, Apollo 10. The uplink is 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.

CAPCOM Roger, 10. We will pass that on to him. And if no LOI 1 burn, you can expect AOS at 0761221.

SC Okay, without an LOI burn, AOS will be 0761221.

CAPCOM Affirmative, out.

CAPCOM Hello, Apollo 10, Houston. We have 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

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.

END OF TAPE

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.

END OF TAPE

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.

END OF TAPE

CAPCOM Hello, Apollo 10, Houston. We'd like to give you a hack on your mission time, over.

SC Go ahead, Houston.

CAPCOM Roger, 10. On my mark it will be 74 hours, 14 minutes even. Stand by, mark 74:14.

SC Roger, Houston, Apollo 10. We're synced right on with you.

CAPCOM Roger.

PAO Charlie Duke gave Tom Stafford that mark 2 seconds early because Apollo 10 is at a distance now in which there is a 2 second delay in communications.

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.

END OF TAPE

SC Houston, Apollo 10.
CAPCOM Go ahead, 10.
SC Roger. Been reading our DSKY?
CAPCOM Roger, sure have. That shows the 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.
CAPCOM Hello, 10, Houston. We show sunrise at 74 hours and 50 minutes and 11 seconds, over.
SC Roger, 745011.

END OF TAPE

PAO This is Apollo Control at 74 hours and 44 minutes and Charlie Duke is talking to Gene Cernan.

SC Hello Houston; Apollo 10.

CC Go ahead 10; over.

SC I cycled the cryo fans at about 71 hours; should we go ahead and cycle them again before this burn?

CC Stand by.

CC Hello Apollo 10, Houston. We'd like you to stir up the cryos again when you normally do it in the preburn checklist; over.

SC Okay, fine. And Houston, in looking 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.

CC Roger; in the South Atlantic, 10? Over.

SC Yeah, I think it looks to me like its right smack in the middle of the subsolar point. Just a continuous white, bright, brilliant light - just a pin-point.

CC 10 - Houston - we'll check it out 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.

SC I'm sure its just a reflection but its the first time I've ever seen anything like that.

CC Roger; we'll see if we can come up 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 down-voice backup and tape recorder forward to forward. Over.

SC Roger Charlie. Do you want those now?

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.
CC That's affirmative 10. And we've 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.
SC Here comes the sunshine.
CC We copy 10; at 74:50 thereabouts.
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?
CC Yep. You can't stir 'em with a 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.

PAO Apollo 10 is 3 012 miles from the moon, velocity 5201 feet per second.

END OF TAPE

CC Hello Apollo 10, Houston. We'd like 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.

SC Houston, Apollo 10. We'll start through 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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1504, GET 7515 271/1

This tape is blank.

END OF TAPE

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.

CC Roger.

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.

SC We can read our DSKY, we've trimmed and we're in a trim attitude and as far as our check list we are minus 6 minutes, waiting.

CC Roger. 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.

END OF TAPE

SC Houston, Apollo 10. Just tried 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.

CC Roger. 10. That's a guarantee- its there. Over.

SC Okay.

PAO That was a trusting Tom Stafford.

SC It's there plus 60 miles.

CC I'll guarantee you on that.

CC Our Trench guys - guarantee 60 by 170 on your, if you can burn on the P40 number.

SC Man the beers on me. If it's 60 by 170.

CC We'll take that.

SC And if it ain't, we don't have to worry about it.

PAO That was Gene Cernan.

PAO And we're coming up on 3 minutes to loss of signal. Mark 3 minutes.

SC Apollo 10, Houston. On my mark it will be 10 minutes to ignition. Over.

SC 10 Roger.

CC Apollo 10, stand by for mark 10 minutes. Mark 10 minutes ignition.

SC We're synched.

CC Roger.

PAO And again he gave you that mark 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.

SC Okay and then we'll see you on 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.

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.

END OF TAPE

POA One minute to LOI. 5 seconds. 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.

END OF TAPE

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.

END OF TAPE

PAO We're waiting.
PAO Mark 2 minutes.
PAO One minute.
PAO Everyone here is watching displays and listening.
PAO 30 seconds.
PAO 10.
PAO We have AOS.
PAO We are getting data. We don't have any 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.
SC Boy, you wouldn't believe this thing.
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.
SC Yeah, kiss that man that runs MSFN.
CAPCOM I don't know whether I can do that or not, 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 percent. Oxidizer is 39 -

END OF TAPE

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.

SC Okay. I watched the unbalance go from where we left it at 200 decrease from the short burns. I didn't touch it until after everything settled 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.

CC Roger. We copied 10. It looks 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?

CC That's great.

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 its go. I think it's confirmed as far as I'm concerned.

CC Rog. We're committed 10. It 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.

CC Roger. Standing by. Over.
SC Okay. We're just passing from 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
SC -photos and it still looks kind of brownish gray to us here, over.
CC Roger, we copy. Here out.
SC There were places back there wher this and that. There was one volcano, whatever it was, 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.
CC Roger. (laughter) We had a couple of comments (laughter) from the back row that I won't repeat.
PAO Those first words we have received 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.
CC Hello Apollo 10. Houston. We have a map update for Rev 2 if your ready to copy. Over.
SC Stand by.
SC Okay Charlie. Go ahead.
CC For LOS 774759, 775827, 783119. we've got a sun rise time of 775140 and a sunset of 791333. Better put your rate back over.
SC Okay Rev 2 is 774759, 775827, and 783119. Sunrise is 775140 and sunset is 791333.
CC Roger.
CC 10, Houston. According to our maps we have you coming up on the sep of waves and to your left Langrenus.
PAO This is Apollo Control at 76 hours, 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.

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.

END OF TAPE

SC -----over.
CC We copy that.
PAO That was Tom Stafford.
CC 10, we're expecting an appropriate comment tomorrow.
SC We'll use the right words. 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.
PAO And Fido wants to get some tracking before he commits himself on the orbital parameters, but he expects them to be right on nominal. Very, very close.
SC We've got Langrenus now out here 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.
CC Roger, we confirm that. We picked 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.
SC Roger, Charlie, and I think we are 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.

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 now. 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 Gene Cernan calling out those landmarks along the ground track.
SC We're 81 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

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, over.

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.

CAPCOM 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.

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.

SC 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.

SC Yea, well I'm right over Maskelyne and Maskelyne B now to be leading right into landing site 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

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.

END OF TAPE

CAPCOM 10, Houston. We'd like you to elaborate 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.

SC To tell you the truth, I didn't look that 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.

CAPCOM Roger. We - he heard the comment, and 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.

CAPCOM 10, Houston. We'd like your bit rate switch to go to LOW. Over.

SC Okay. Sorry, I didn't catch that earlier.

CAPCOM That's okay.

SC Houston, 10.

CAPCOM Go ahead, 10. Over.

SC Okay, I guess I'm looking for some words 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.

CAPCOM Stand by. We'll get you some words on that.

SC It's the oxidizer flow valves is what I'm referring to.

CAPCOM Roger. We'll get you some words in a minute. Over.

SC Okay, Charlie. The thing I didn't understand 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.

SC Boy, Charlie. I never saw nothing like 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

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 -

END OF TAPE

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, Apollo 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 horison, so you might be able to see it. Over.

SC 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

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.

CC Roger. WE copy that. Over.

SC --in 10 degree deadband plus or minus 10 degrees. That's all we are allowed in this sleep configuration, isn't it?

CC That's affirmative, 10. That is what we want. You've got the proper entry. Over.

SC Hello, Houston, 10.

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.

SC Well, we can't. The moon past 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.

CC 10, we copy.

SC Houston, this is 10.

CC Go ahead, 10. Over.

SC I can -- the LM thrusters stick 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.

CC Roger. 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.

SC Houston, Apollo 10. In earth 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.

SC It's really what you call Field Grade Nighttime Flight, Charlie.

CC Roger. CAVU, eh? We got you.

SC Good thing this is all Field Grade.

SC Roger.

SC It's what John and I call Commander's Moon in the Navy.

CC WE've got a lot of smart guys here in the CAPCOM console.

SC Hey, Charlie, the best I can figure out we're passing now out of the Ocean of Storms into some more rugged country which is very evident on the surface.

CC Roger, Gene, we are plotting you right along. That's a good call.

SC Boy, that engine worked like a champ, Charlie.

CC Roger.

SC What did you think of those residuals?

CC Man, that's really great. We 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.

SC Well, we got a YAW of 20 degrees 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.

SC We'll take it back there.

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.

SC Either that or there is a big MASCON up north or something.

CC It might be that giant S Gargo 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.

PAO That's John Young.

CC That's very descriptive, John.

SC I'm a little behind these other guys, they make---

CC Apollo 10, Houston. John say again all about the Christmas tree. Over.

SC I said I don't mean lit with 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.

CC Roger. We recommend you get your share of viewing time, also.

PAO Apollo 10 is approaching 70 degrees 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.

SC Would you believe you can even see down in the craters in the earth shine shadows. Or is that going a little too far?

END OF TAPE

SC - see down in their craters and the earthside shadows? Or is that going a little too far?
CAPCOM That's going pretty far there.
SC Hello Houston, this is 10.
CAPCOM Go ahead.
SC Okay, it appears - I can 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.
SC And I can see, I can see Schluter with a central peak very, very easily.
CAPCOM Roger, understand. You got Schluter.
SC Okay.
POA Schulter is a crater at 85 degrees west.
CAPCOM Hello Apollo 10, Houston. We 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.
SC We can do it right now. And 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.
PAO The Flight Dynamics Officer, 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.
SC That's about the only way I 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 -

END OF TAPE

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.

SC Charlie, there's a - there's a three 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.

CAPCOM Roger, 10. On this - your comment about 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 - 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 No, not at all.

CAPCOM 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.

SC What's going on out there is - there's no air glow at all, it's just a sharp definition between the moon surface and this parabolic glow that's out there.

CAPCOM There's a good sharp horizon there, huh?

SC ...

SC Yeah, I think you could make a cant shot off a horizon like that.

SC You can tell it has to be well lighted.

CAPCOM You might make a cant shot, but I'm not.

SC I didn't even think you knew what that meant.

CAPCOM Oh, I know all the words.

CAPCOM LM launch might be just like a cant shot.

CAPCOM 10, Houston. Coming up on three. You 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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1739 GET 7750 285/1

PAO -31 minutes from now. This is Mission Control Houston at 77 hours, 50 minutes.

END OF TAPE

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.

END OF TAPE

CC Hello Apollo 10. This is Houston standing by.

SC Looked like the REACQ mode worked pretty well there and then we acquired and read you loud and clear.

CC Roger 10. We had you. Go through that again about the REACQ. Over.

SC (Garble) and yaw angle into REACQ narrow deadband in this attitude picks you up loud and strong here.

CC Roger. Where did the antenna go at pitch and yaw at LOS. Over.

SC Charlie, I'm not sure I can answer that one specific question.

SC 10, Houston. Do you think the antenna 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.

SC I went to REACQ and fired LOS and it did 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 rate command in. We'd like you to select high bit rate over.

CC Hello 10, Houston. Over.

SC Go ahead. I'll give it to you, Charlie.

CC Okay. We've got it. We've got a look for 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.

SC Okay, map update Rev 3 795622 800641 and 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 ...

CC 10 Houston. We'd like you to go up telemetry 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.

SC Okay. Off and then normal and then I'm ready to copy.

CC Roger, 10 here comes the LOR 2 pad. SPS 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....

END OF TAPE

CC ---plus 006010130901401325
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.
SC Roger. LOI, QSP, G&N 38650 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.
CC Roger. That DELTA VC was 01324. Over.
SC Roger. ..... that's what I've got written down, 01325.
CC Roger. Stand by for the TEI pad. 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.
SC Okay, Charlie. Wait a minute. My finger is still on a button here, I'll be right with you.
SC Go ahead, Charlie, with the TEI 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.

PAO And if this burn goes as planned, we will circular ---

CC Apollo 10, Houston, ready with the 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.

SC Okay. TEI5, SPS, G&N, starting with noun 48 is minus 061 plus 047086191000 plus 36430 minus 01492 plus 00546, PITCH angle is 025.

CC That's affirmative. And we've had a problem with our uplink at Goldstone. They are configuring now and we'll be with you in a - momentarily. Over.

PAO If this next burn goes as 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?

C C 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.

END OF TAPE

CAPCOM - also for TV if we try the dark side TV recommend a ALC to inside and and F-stop of 2.2, over.

SC Okay, we got that Charlie and 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.

SC Charlie, just for reference 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.

PAO This is Apollo Control. We've played back the data from behind the Moon during the LOI 1 time.

SC You can really see some boulders in the bottom of Messier A now. Yea, you can see some tremendous boulders down there.

CAPCOM We copy, 10. We finally got 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.

CAPCOM Roger, that's very good, 10, out.

SC Roger, we think we've got a few colors here for you at least you're certain of the ones that are real black going into whites and then some browns.

CAPCOM Rog, we heard your tape on 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.

CAPCOM 10, Houston. If you've got 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.

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. I 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 are. It probably came either from water or from the resultant 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.

SC Okay Houston. This time we are looking down, right down on B1 out of the hatch window.

CAPCOM We copy, 10. How's the terrain look around there?

SC Looks just like the map.

CAPCOM Rog, how does the terrain look around that area?

SC With the naked eye it's full of holes.

CAPCOM Roger, it looks pretty smooth 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.

SC Okay, we're back in block. We're 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.

CAPCOM A slight shudder emanated from the geologist back there.

SC Charlie, I'm personally amazed 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.

END OF TAPE

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.

CC Roger. We copy, 10.

CC 10, can you see on the CSM lunar orbit map the spot marked 112 near site 2? It looks like a bright, whiteish crater? Over.

CC Oh, that's Moltke. Excuse me. Sorry about that, 10.

SC Moltke is very, very easy to see. 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 rills.

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 landed.

END OF TAPE

SC Houston, Apollo 10. We see the solar 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 mostly a long shaft of light, and we can still see it. It's still there.

CAPCOM Roger, 10.

SC Houston, Apollo 10. It's - the corona 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.

CAPCOM Rog. On the TV pass, do you think we 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.

CAPCOM 10, how long does the shafting look as it comes across. Does it get shorter as you go away or just sort of fade out? Over.

SC It just fades out, and the shafting's 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.

END OF TAPE

PAO This is Apollo Control. Apollo 10 is - 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.

PAO Apollo 10 is 22 minutes away from loss 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.

CAPCOM Hello, Apollo 10, Houston. 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.

END OF TAPE

CAPCOM Hello 10, Houston. Over.
Hello 10, Houston. Over.
SC Roger, Houston. Now I'm reading 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.
SC Yeah, we got that, Charlie. Thank you. Houston, this is 10. Can you recommend an omni for the burn?
CAPCOM Stand by.
SC For the burn attitude before LOS.
CAPCOM Roger, 10. We copy. Your best omni is Charlie, over.
SC Okay, that's where I am now 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, CP1 and CP2.
CAPCOM Rog, 10. It really sounds 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.
SC You wouldn't hurt the wide 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.
SC Okay, I'm looking ahead in 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

SC - to delay the canister change and also that fuel cell 02 purge until afterwards. The C02 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.

END OF TAPE

PAO P40 is the service propulsion system testing program in the command module computer.

SC Are you all getting the high bit rate now?

CAPCOM That's negative. We got your low bit rate. We're seeing at program 40.

SC Rog. In other words you can read all that stuff, you need high bit rate up with you. Huh?

CAPCOM 10, we can command the low bit rate even, 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 minute LOS. You're looking good. Go on over the hill. We'll see you AOS 80:40:47. Over.

SC Roger. 80:40:47.

CAPCOM And 10, one more update for you after 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.

PAO And we do have loss of signal now. 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 miles. We're presently showing Apollo 10 in a lunar orbit 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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 2014 GET 80:25 295/1

PAO This is Apollo Control and we should be 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.

END OF TAPE

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 by. Apollo 10, Houston standing by.

SC Roger, read you loud and 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.

SC Charlie, we've got some TV 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

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.
SC Okay, we'll be coming up 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.
CAPCOM Roger, that's affirmative and the was F1 you were showing us there just a minute ago, Gene-O.
SC Roger, okay. I've got this at full zoom. Do you like it at full zoom or do you want 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.
SC Okay, we're on inside right now and we'll give you a mark when we go to outside.
CAPCOM Roger.
SC Okay. Mark it. We're on 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 -

END OF TAPE

CC The position on that ALC seems to give us better resolution here than the inside. How does that compare with your monitor?

SC Same way, Charlie. Outside gives 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?

CC It still looks exactly the same, Tom and that's perfect.

SC Okay. I've got a real bright crater. I'm going to zoom in on the top of it. 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.

CC Roger. It's looking here exactly 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.

CC Roger. They are showing up real good, just like that down here on the screen, Tom.

CC 10, This is Houston. We'd like, 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.

SC Okay. We'll take you on the right 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.

CC Roger. It looks pretty impressive 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 Gene. Are you cycling the aperture at all, during this time?

SC Yes, that is what I was doing and when I opened it up and then stop it down, my monitor just goes very clear for you.

CC Same here. When you stop it down 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.

CC I wonder if you could zoom in on that central peak with that aperture shut down a little bit. Oh, you got it. I'm sorry.

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.

SC -- over here, I'm losing out of my window.

CC Roger. And just for your information, your onboard vector looks great. We're satisfied with it.

SC John is going to show you Mare Crisium over there on his side.

CC Okay, we're standing by.

SC You can see the horizon in the distance there.

CC That is just absolutely beautiful.

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.

END OF TAPE

SC We ain't getting bad detail light up here.
CC Roger back.
SC The low flat ridges really do stand out here in the MARIA area.
SC We're coming right up on Taruntius 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.
SC And eastern on Messier A it appears 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.
CC Rog. Which window are you looking out of now Gene?
SC Tom has got it out the hatch window.
CC Okay. Just for your info, we're 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.
CC Rog. That's where all the pencils are pointing down here, Gino.
SC Okay, Joe Jack, we're passing over the Apollo ridge right now looking down.
CC Well listen you guys. That color is really spectacular. That really brings it home.

SC Okay. Its about kind of a, it's still half between gray and brown right now Joe.
SC Jack. Your looking at some of 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 B1 right now.
CC Roger. We're picking it up. Gene. We've got it in the upper left hand portion of our screen now.
SC And I don't know what- Okay, I 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.
SC That is Sasserides should be oblique to you.
PAO Sasserides is a relatively new lunar crater and great scientific interest.
SC Here it comes. Here's the crater Maskelyne.
CC Roger. We copied.
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) Maskelyne B.
SC And here's our little our little

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 -

END OF TAPE

SC - start across the terminator if I can just keep the floodlight off the window, you can see it.

CAPCOM Okay, Tom. Can you go to inside on ALP and to 2.2 on your camera now.

SC Jack, the area now is being uncovered by light in the landing site 2 area looks a little bit rugged.

CAPCOM Copy that. Rugged.

SC Okay, the rill you see beside Moltice is what we have termed as highway U.S. 1.

CAPCOM Roger. We're getting that loud and clear, Tom. That shows up real good.

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.

SC Well, it didn't come in too good on my 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 gotta repress the LM and get on with the LM activities.

CAPCOM Roger. That Tom. We'll pick up the color chart now. Give us about 5 or 10 seconds of that.
SC Tell you what, Joe, I'll just hold this.
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)
CAPCOM Really great. The colors were great too.
CAPCOM Okay, what I'm recommending this, 10, but your 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.
CAPCOM Okay, Apollo 10, this is Houston.
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?
SC Okay, we fully expect to find it in the 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.
SC Go ahead, Joe.
CAPCOM Okay, 10, I'll 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

CAPCOM - 000 North 304825. That concludes and standing by for the read back.

SC Stand by one second.

CAPCOM Roger, that.

SC Okay, Joe. Here they come real quick. Rev 4 is 8153018204488239118200418313O8. You with me?

CAPCOM Roger, that's correct.

SC F1 is 823845824347 3balls 326 and 3 balls, North 071220.

CAPCOM Roger, that. Go ahead.

SC 825547830050 3 balls 274 3 balls North 304825.

CAPCOM Read backs, correct, Gene. Thank you.

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.

END OF TAPE

PAO This is Apollo Control at 82 hours, 21 minutes. During the Change of Shift Briefing Apollo 10 completed the third revolution. We collected about 4 minutes of conversation with the crew on tape. We're 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 up the mess. We'll play back the tape of that conversation 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 Houston, this is the LMP. I'll be going off the air, Joe. I'll be talking to you from inside Snoopy later.

CAPCOM 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 Roger, Tom.

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 you 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 Okay, minus .1.

SC You can tell how close it is. He can't make up his mind whether it's plus or minus.

CAPCOM That must be pretty close.

SC That's thanks to you, Joe. You really got an eyeball for calibrating that thing.

CAPCOM Roger, that. Okay, 10 this 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.

SC Roger. And Geno is just now moseying into the LM followed by showers of insulation.

CAPCOM Roger.

SC Hey, we're going to have a 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.

CAPCOM Yeah, okay Tom. You might 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

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 1 which is in the middle of Smyth's Sea. This is a crater about 5000 feet in diameter.

CAPCOM Standing by.

PAO And we've just put in a call to the crew.

CAPCOM Hello, Snoopy, this is Houston. How do you read?

CAPCOM Apollo 10, Houston. How do you read?

CAPCOM Apollo 10, this is Houston. How do you read?

CAPCOM Hello, 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.

END OF TAPE

CAPCOM Charlie Brown, this is Houston.
CAPCOM Charlie Brown, Houston.
CHARLIE 10, we're reading you loud and clear.
CAPCOM Okay, Charlie Brown, I understand you're 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?
CAPCOM Okay, Snoopy. We caught that one, Geno, and how do read Houston?
SNOOPY Reading you loud and clear, the only problem is that my command module hose is out here. My command module ... Everything is squared away, everything is going smooth (garbled) over.
CAPCOM Okay. You're pretty tough to make out 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.
SNOOPY Houston, Houston. I'm CSM Comm, Charlie 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?
SNOOPY It's pretty lousy. Everything else in 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.
CAPCOM Okay, Snoopy. This is Houston. You 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

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.

END OF TAPE

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, We sure can not. That's a negative receive on Snoopy, Charlie 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. And 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.

CAPCOM Snoopy, this is Houston. If 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?

SNOOPY Okay, real quick, let me, let me 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.

CAPCOM Loud and clear, press on.

SNOOPY Okay, reading the ICS PTT now. 1 2 3 4 5, 5 4 3 2 1.

CAPCOM Loud and clear, press on.

SNOOPY Okay this is PTT. How do you read me, 1 2 3 4 5, 5 4 3 2 1.

CAPCOM Loud and clear, press on.

SNOOPY Now I'm in vox, how do you read me in vox, 1 2 - - 5, 5 4 3 2 1.

CAPCOM Okay, give me a long count in 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.

SNOOPY Okay, step 1, I go to voice, 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.

CAPCOM Okay, Goldstone, this is 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.

CAPCOM Contact Goldstone, we are there.

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.

CAPCOM Okay, Snoopy sounds good. Stand by just a second.
SNOOPY Roger that. You're cut out, you'll say again.
CAPCOM Okay Geno we're go with that 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

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.
CC Okay Snoopy, this is Houston in the 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.
CC And Snoopy, this is Houston, if you're in step 5, how about a voice check.
CC Okay Snoopy, this is Houston, we've 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.
CC Goldstone, this is CAPCOM. 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.
CC Okay Snoopy, this is Houston, we're reading you now Geno.
SNOOPY (Garbled). Okay Joe, do you read me now.
CC Roger, reading you now Geno.
SNOOPY I supposed you're worried because 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.
CC Okay, we're going to stand by until 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 Okay. Goldstone, CAPCOM. Goldstone, CAPCOM, come up please.
GOLDSTONE GOLDSTONE.
CC Roger, the configure LM mode, 6.02.00. Give a roger.

GOLDSTONE That's affirmative, we are configured.

CC Okay, Goldstone I'm standing by for a lock on announcement. Charlie Brown, this is Houston. 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 Roger Houston, do you read.

CC Hey get you loud and clear Geno. we should be ready to press on now and give me a long count in each of your three modes again.

END OF TAPE

CAPCOM Houston, standing by.
SNOOPY Roger Houston, do you read?
CAPCOM Hey, got you loud and clear, Geno. We should be ready to press on now, and give me a long count in each of your three modes again.
CB Houston, Charlie Brown .....
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.
SNOOPY What's LOS time, Joe?
CAPCOM We've got about 33 more minutes 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?
CB Roger, that's what we did, over.
CAPCOM Okay, thank you much.
SNOOPY How soon?
SNOOPY Okay, Houston, I've got you locked up on Auto, how do you read?
CAPCOM Snoopy, this is Houston, I'm reading you loud and clear. Geno, a long count in each mode and identify which mode you're in please.
SNOOPY Okay, I'm in PTT and instead 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.
CAPCOM That's verified.
SNOOPY Okay, and I'm in vox, and you're reading me loud and clear, I guess.
CAPCOM That's affirmative Snoopy. We're reading you loud and clear, and stand by 1, we'll see if we're ready to go on here with the data.

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.

CB What happened? Did that last thing get transferred from the land mark track, over.

SNOOPY So far so good.

CAPCOM Roger, that's affirmative. 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.

CAPCOM Negative, stand by in the FM 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.

SNOOPY Okay, fine Joe, I'm in FM right now.

CAPCOM Okay, we'll be with you in just a minute.

MCC Goldstone, this is Capcom.

GOLDSTONE Goldstone.

MCC Roger, Goldstone let's configure 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?

SNOOPY That's affirm, I am in down voice back up. Let me go to voice.

CAPCOM Roger, that.

CAPCOM Okay, Snoopy, this is Houston. We're standing by for a call on FM mode. Would you try one more time please.

CB Houston, this is Charlie Brown. 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

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.
END OF TAPE

CC Snoopy, this is Houston. I'm still 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'll 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.

SNOOPY Okay I'm in PM mode and I can hear 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?

CC Roger, reading you. Go ahead.
SNOOPY ... try and take some ....
CHARLIE BROWN Hello Houston, Charlie Brown.
CC Go ahead, Charlie Brown, Houston.
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.
CC Roger, Tom. We're not able to get 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.
CC Snoopy, this is Houston. Roger 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.
CC Okay, I'm reading you loud and clear, 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

SNOOPY Well, I'm down to about 27 volts 27 2 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.

CAPCOM Okay, thanks.

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.

CAPCOM Go LM mode 6.02.00 and verify it.

GOLDSTONE Wilco.

GOLDSTONE Capcom, Goldstone. We confirm uplink mode 6.

CAPCOM Roger. Thanks.

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 Roger. Reading you Snoopy. How about 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.

CHARLIE Roger. 1, 2, 3, 4, 5.

CAPCOM Okay, Tom, I'm reading you loud and clear - 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

SNOOPY LM relay set. I've just been waiting for your call.

CAPCOM Roger that. We're going to terminate that, Gene, and we'll pick that up later. We want to go back to basic comm now.

SNOOPY You were cut off by Charlie Brown. Say it again.

CAPCOM Okay, we verify we're not going to check that right now, Gene. So we want to go back to the basic comm mode.

SNOOPY Okay, stand by a minute.

CAPCOM Roger that.

CAPCOM Goldstone, this is CAPCOM.

GOLDSTONE Capcom, Goldstone. Go ahead.

CAPCOM Okay, let's go back to basic comm. That will be LM 6.02.00 and command module 6.02.00.

GOLDSTONE Roger, I copy. LM 6.02.00.

CAPCOM Roger and command module (garble)

SNOOPY Okay, Joe, how do you read me?

CAPCOM Okay, Snoopy. This is Houston; reading you five by.

GOLDSTONE CAPCOM, Goldstone, we confirm.

Snoopy Okay, I'm reading you loud and clear.

CAPCOM Roger that.

CAPCOM We've got about 8 minutes until LOS, Gene. 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 get back home. I'm in the command module up there or down 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?

SNOOPY The glycol temp has been sitting on zero 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 check, Gene. We're showing your AG deadband switch in the max position. Would you verify it min and cycle it to the min position?

SNOOPY Okay, Ed. It is in min and I'll cycle off to max and then back to min.

CAPCOM Roger.
SNOOPY It's in max now and I'll bring it back to min again.
SNOOPY Okay, it's back in min.
CAPCOM Okay. The ascent oxidizer is reading 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.
SNOOPY Which ascent pressure was that? Helium pressure or REG pressure?
CAPCOM Oxidizer pressure, please.
SNOOPY Okay, oxidizer pressure looks like it's about 180 psi.
CAPCOM Okay, Snoopy, if you will put that circuit breaker again please.
SNOOPY Okay, Ed, it's out. By the way everything 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.
CAPCOM Roger. What we heard was good, what we didn't hear was obviously - obvious that we didn't hear it.
SNOOPY Okay, fine. I'll be closing out the LM and finishing housekeeping and see you next door.
CAPCOM Charlie Brown, Houston.
CAPCOM Charlie Brown, Houston.

END OF TAPE

CAPCOM Charlie Brown, Houston.
CAPCOM Hello. Charlie Brown, Houston.
CHARLIE BROWN Charlie Brown, Houston.
CAPCOM Snoopy, Houston.
CAPCOM Charlie Brown, Houston.
CAPCOM Charlie Brown, Houston.
CAPCOM Charlie Brown, Houston, transmitting in the blind, we show an 02 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

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 Apollo 10, this is Houston, we're standing by.

CAPCOM Apollo 10, Houston.

MCC Honeysuckle, contact Houston,

.....

HONEYSUCKLE Houston contact Honeysuckle. Read you very weak, very weak.

MCC Roger stand by. Voice control Houston, contact. Voice control Houston, conference.

GODDARD VOICE

MCC Roger, Honeysuckle reports 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 moon. This is Houston. We're reading you loud and clear, John. How are you doing now?

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 module, Gene?

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

SC ..... your nose ... a little bit. That should be a space first, snow on the moon. Hey I've got lots of things for you to copy if you've got a pencil.

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, O2 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.

SC Okay, I'll go to po and accept. Stand by. Okay Houston you have Po and accept.

CAPCOM Roger, that.

SC And I have some news from Snoopy. He's a pretty good fellow, by the way.

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 -0.1

CAPCOM roger that.

SC My docking pilot has a good 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

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.

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 - -

END OF TAPE

SNOOPY - and shut down EPS, battery 1, 2, 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

SNOOPY That's not possible is it?

CC Roger, everybody's shaking their heads yes Ed.

SNOOPY The name's Gene, Joe.

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.

CC Okay I'll check into that.

SNOOPY But other than that I'm real happy. 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.

CC Okay, understand.

SNOOPY You get some reports from Snoopy today, I hope we - go ahead Joe.

CC Okay I was just going to tell you, 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

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.

CC Roger, understand John, thanks.

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.

CC Okay Charlie Brown - Apollo 10. 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.

SC Okay we've got number 1 H2 tank 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.

END OF TAPE

CHARLIE Also the intake to these hoses.
CHARLIE You know we've been cleaning all these exhaust hoses and the intake to the inflow valve off a couple of three times a day.
CAPCOM Okay, I understand.
CHARLIE But doing LM ingress - doing LM ingress the flow of mylar overcame the flow of cleaning off the hoses.
CAPCOM Okay, I understand.
CAPCOM Apollo 10, Houston. I've got a maneuver pad I'll send up to you whenever you're ready to copy.
SC Okay, Joe. One more second.
SC Okay, Houston. I'm ready.
CAPCOM Okydok, 10, this is for TEI 10, 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.
SC Okay, Joe. TEI 10, SPS G&N, starting 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.
SC I'm sorry. That's what I've got written down. 096, 02, 4054.
CAPCOM Roger that.
CAPCOM Okay, Geno, now we got some words 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.
SC Okay, fine, I'm hoping that next 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?
SC It looked like high velocity oxygen 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.

CAPCOM Rog, okay. Well, listen, if it's 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 tarycloth 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.

CAPCOM Roger.

SC One other little item. I forgot about Snoopy.

CAPCOM Okay, go.

SC I didn't - I didn't get a chance to 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

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?

CAPCOM Roger, that's affirmative.

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.

CAPCOM Okay, how about the portable 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.

SC Okay there off, Joe and I did 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.

SC Is that okay for sleep then.

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.

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.

CAPCOM 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

CHARLIE Houston, this is Charlie Brown.
CAPCOM Roger, Charlie, go ahead.
CHARLIE Okay, we're going to let battery recharge all night, is that correct?
CAPCOM That's affirmative.
CHARLIE Okydok.
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.
CAPCOM That's affirmative.
CHARLIE Okay.
CAPCOM Apollo 10, Houston.
CHARLIE Go ahead, Houston; 10.
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.
CHARLIE I'm sorry, Joe.
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.

END OF TAPE

CHARLIE BROWN Hello Houston, this is Charlie Brown.
CC Hi Charlie Brown, Houston, go ahead.
CHARLIE BROWN OK. Reading ... 26036 the chimp is 05036 and the LM is 15038.
CC Okay, we copied all that.
CHARLIE BROWN The Cernan had nothing, and the 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.
SC And I'm sure much to your joy I might 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.
CC Okay. Let's see, I guess, are you 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 Rog. John, the guys in the back room have come up with some critique on the marking if you're interested in discussing it.
SC Sure, go ahead.
CC Okay, talk about F1 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 time. But the marks on F 1 were really great. On B1, 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

pretty near the turning limit as you probably observed. Have you got any comments on the B1, the marks were still good except for there but they're not quite as good as on F1. It was pretty good OJT for the first crack at it.

SC That F1 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 F1 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 B1 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.

END OF TAPE

CAPCOM .... today, and got a big day tomorrow so let's go to sleep, get ready for it.

SC Yea we concure that. We're getting a little bushed up here and we're just about to turn in and fix breakfast.

CAPCOM DEKE wants you to hurry up and eat. He says he's getting hungry.

SC Okay. Hey DEKE don't forget to skip lunch today. You didn't have time for it.

CAPCOM Okay he's one up on you. He only gets 1 meal tomorrow then I guess.

SC That's right. Keep him honest.

DEAD AIR

END OF TAPE

CAPCOM Okay, Apollo 10, Houston.
SC 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. 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.

END OF TAPE

PAO This is Apollo control 86 hours 35 minutes. We're about 50 seconds now from acquiring 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.

SC Houston to Apollo 10, over.

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.

SC It sounds like it's really using 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 like to confirm. I think maybe the problem may be in 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.

CAPCOM Okay, Apollo 10, this is Houston. 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

CC - one disabled and I have two of them to turn on as soon as you get those.
SC Okay, I got those turned off.
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.
SC Okay, so this configuration that we've got on the (garble) RCS switch, which is now compatable with the DAP is that correct?
CC Okay, that's confirmed. 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.
CC Okay, we sure appreciate it. Why 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 mission. This is Apollo Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0335, GET 87:47 320/1

PAO This is Apollo Control at 87 hours 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.

END OF TAPE

PAO This is Apollo Control 88 hours 32 minutes 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 time. At 88 hours 41 minutes, this is Apollo Control.

END OF TAPE

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.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0621, GET 90:32, 323/1

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.

END OF TAPE

PAO This is Apollo Control, 91 hours, 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.

END OF TAPE

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

PAO This is Apollo Control 92 hours 51 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."

CAPCOM Apollo 10, this is Houston. 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.

CAPCOM Roger, 10, we copy. Go ahead and have your breakfast and we are ready to go when you are.

SC We're a bit ahead of schedule. We've 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.

CAPCOM Apollo 10, Houston, how do you read?

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.

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 No, we will get that later, Jack, thank you.

CAPCOM Houston, roger.

SC Okay, that was terminate battery B charge on waking up and dump the waste water to 36 percent.

CAPCOM Roger, 10, that's affirmative.
SC Is that all the update? Over.
CAPCOM Roger, 10, that's the end of the update.
SC Okay, thank you.
SC Good morning, Smiling Jack.
CAPCOM Good morning. You boys have been up a while, I see.
SC Yes, we tried to sneak up on it by just about a half hour or so.
SC Or more.
CAPCOM Roger, 10, I know you're busy. If you have some time to listen sometime when you are interested, I have the local newspaper again.
SC Go ahead, we would like to listen to it.
CAPCOM Okay. One kind of interesting thing 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 boat. The man who must keep his papyrus boat together with 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 -

END OF TAPE

CAPCOM If he succeeds in reaching Mexico in his boat, modeled after a 4700 year old Egyptian craft, Heyerdahl 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: Moscow TV showed the Apollo 10 astronauts in a 1 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,

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.

CAPCOM Okay, 10, LOS is going to be at 93:42, and AOS will be at 94:29. Over.

SC Roger, 93:42 and 94:29.

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 -

END OF TAPE

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 Okay.

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 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.

END OF TAPE

PAO - by on air to ground for resumption of communications with Apollo 10.

CC Apollo 10, Houston. I have a map-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?

CC That's affirm. Loud and clear.

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.

CC Roger, we copy. Stand by 1 on the batt. Apollo 10, Houston; you are clear to terminate battery charge.

SC Okay, thank you Jack.

END OF TAPE

CC Apollo 10, Houston. We'd like you to verify that all the fans are OFF in the cryo tanks; over.

SC Negative Jack; I had them cycling; thank you, I'll turn them off at this time.

CC Houston; roger.

SC I got too many meters running I guess right now.

CC Take your time, but hurry.

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.

CC Okay, map update; rev 10. 093 42 40 093 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.

SC I think we're in pretty good shape 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.

SC Okay, we'll dump to 36. 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.

END OF TAPE

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.

END OF TAPE

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 -

CC Go ahead Apollo 10, Houston.

CHARLIE BROWN Roger, Tom and Gene are in the LM checking things out.

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 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.

CHARLIE BROWN Roger. He's changing antennas now.

SNOOPY Houston, Houston; this is 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.

SNOOPY Okay, how do you read me now Jack?
CC Okay, Snoop; I don't hear the noise now but you're way down in the mud.
SNOOPY Okay, I'll try and talk louder. But the noise was cause I was on ... down voice back up again; I have a high freq in here; I'll bring you up to date - you might get your activation and checkout list and wait 1 second - I'll tell you where we are.
CC Okay, Snoopy - we've got the - we've got -
SNOOPY (garble)
CC Snoopy, this is Houston; we've got the checklist out; be advised you are still down in the mud.
SNOOPY Okay, I'm yelling as loud as I can. We are on page 29. On page 29. I just finished the LGT filter - the spacecraft is all GO; I found nothing wrong with it; Tom is in here suited. He's up through page 29. I'm ready to do the S band T/R power amplifier check, and then I will do the steerable check and I will go out and get suited while Tom continues; are you with me?
CC That's affirmative Snoopy; we are reading you.
SNOOPY Okay - I'm presently on high voltage test and I'm ready to go S band transmitter receiver secondary and power amplifier secondary; are you ready?
CC Stand by 1. Snoopy; this is Houston; go ahead.
SNOOPY I got your helmet here. Okay, go ahead and I'll wait 60 seconds. John, do I have your helmet? Hello, Houston, Houston. This is Snoopy. How do you read on secondary?
CC Snoopy, this is Houston; we have a lot of noise in the background; hearing you very weakly.
SNOOPY Okay, I hear you loud and clear, I'll go back to primary at this time.
CC Roger; hear you're going back to primary.

END OF TAPE

CHARLIE BROWN Houston, this is Charlie Brown. Snoopy is ready to do the steerable S-Band antenna check, over.

CAPCOM Snoopy, this is Houston.

CHARLIE BROWN Houston, Charlie Brown, over.

CAPCOM Snoopy, this is Houston. Request you try turning your ranging switch off, over.

CHARLIE BROWN They want you to try turning your ranging switch off, Gene.

SNOOPY (garble)

CAPCOM Okay, 10, we're still hearing you very weakly, and a lot of background noise, over.

SNOOPY (garble)

CAPCOM Hello, Snoopy, this is Houston. Go ahead with the steerable check, over.

SNOOPY (garble)

CHARLIE BROWN Yes, just about.

CAPCOM Charlie, this is Houston. We're still reading Snoopy very weakly with a lot of background noise so you may have to relay some.

CHARLIE BROWN Roger.

CHARLIE BROWN Okay, Snoopy, we're at the attitude.

SNOOPY Okay, and I should have good high gain lock. Hello, Houston, this is Snoopy. How do you read on high gain?

CAPCOM Oh, that's much much better now, Snoop.

SNOOPY Okay, I don't know if that's any sign. That was a piece of cake. I hope it works that way.

CAPCOM You're coming in loud and clear now, Snoopy.

SNOOPY Okay, Jack, things are going, so far, real well up in here. I'm about ready to go off the loop here, go back and get suited up, and we'd like to stay ahead of the game if we can. All my voltages look real good. Just to bring you up to date, I'm reading 30.2 on the Commander's bus and 30.2 on the Systems Engineer's bus. Inverter number 2 is in the high side of the green. Battery number 6 is reading 37 and battery number 5 is reading 37.

CAPCOM Roger, we copy, Gene.

SNOOPY And our glycol temperatures started out at about 70 or 75 and came down very slowly, and is now within the green band. I guess it's about 50 - 48 degrees right now. Our steam pressure looks good, within the nominal limits. And our ambient pressure looks good, and our ascent helium pressures look good also.

CAPCOM Roger, Snoopy, we copy.

SNOOPY Okay, Jack, the next time I see you

I'll be dressed for the occasion.
CAPCOM Roger, we'll be looking forward to it and we'd also like to keep ahead a little bit.
SNOOPY Okay, I'm going back to suit up.
CAPCOM Roger, Gene. And Charlie Brown, we have a landing site 2 track pad when you're ready.
CHARLIE BROWN Roger, landing site 2 track pad, go.
CAPCOM Roger, 096:47:24, 096:52:24, 000 270 000 north 11 19 21 - what's this? - and your site is 130.
CHARLIE BROWN Roger, 096:47:24, 096:52:24, roll 0, pitch 270, yaw 0, north 11 miles.
CAPCOM Roger, Snoopy, and we've got a 1921 and 130.
CHARLIE BROWN Yes, bet you.
SNOOPY Hello, Charlie Brown. Snoopy would like to do VHF A Simplex check now.
CHARLIE BROWN Roger, going VHF A Simplex.
SNOOPY Roger, John.
CHARLIE BROWN Snoopy, Charlie Brown. How do you read?
SNOOPY Roger, Charlie Brown, this is Snoopy. I'm reading you loud and clear. How me? Okay.
CHARLIE BROWN Snoopy, Charlie Brown. How do you read? Over.
SNOOPY Roger, John, you're really blasting me out. I'm reading you loud and clear. How do you read me, John?
CHARLIE BROWN Snoopy, Charlie Brown. Do you read?
SNOOPY Roger, I'm reading you loud and clear, John.
CAPCOM Charlie, this is Houston. Snoopy is reading you, over.
CHARLIE BROWN Rog, I know it. I read him loud and clear on Bravo.
SNOOPY Hello, Charlie Brown, Snoopy. How do you read on Simplex A?
CHARLIE BROWN Tom, I can hear you but just barely. I've got the squelch turned all the way off.
SNOOPY Okay, you're coming through loud and clear. I'll tell you what, I'll increase the squelch here a little bit. How do you read now, John?
CHARLIE BROWN I can hear you talking in the background, but I don't understand anything you're saying. Let me switch antennas.
SNOOPY Okay.
CHARLIE BROWN Snoopy, Charlie Brown, over.
SNOOPY Roger, John. You're coming through

and loud and clear.

CHARLIE BROWN I don't hear you, Tom.
SNOOPY Okay.
CHARLIE BROWN Hey, can we go back to VHF B?
SNOOPY Let's go back to B Simplex.

END OF TAPE

SNOOPY - clear.
CHARLIE BROWN I don't hear you, Tom.
SNOOPY Okay.
CHARLIE BROWN Then can we go back to VHF-B?
SNOOPY Let's go back B.
CHARLIE BROWN Hello, Houston, this is Charlie Brown. Do you have any suggestions?
CAPCOM Stand by one, Charlie.
SNOOPY Charlie Brown, Snoopy. How do you read on VHF-B? Can you read me on VHF-B?
CHARLIE BROWN I read you loud and clear, Tom.
SNOOPY Let's stay here.
CHARLIE BROWN Okay.
CHARLIE BROWN Can we try duplex B, over.
SNOOPY Stand by.
SNOOPY Go ahead on duplex B.
CHARLIE BROWN Snoopy, Charlie Brown. How do you read? Over.
SNOOPY Roger, loud and clear, John, really loud and clear.
CHARLIE BROWN I can't hear you on duplex B, Tom.
SNOOPY Okay, let's go to B simplex and stay there a while, John.
CAPCOM Charlie, this is Houston. Snoopy wants to do a B simplex. He's reading you, you're not reading him.
CHARLIE Roger, I read you loud and clear on B simplex, Tom.
SNOOPY Roger, I'm reading you loud and clear on B simplex, too, John. Let's just stay here.
CHARLIE BROWN Houston, Charlie Brown. Can you work this problem, please?
CAPCOM We're working on it, Charlie.
CAPCOM Charlie, this is Houston. We're finished with your computer. You can go to block.
CHARLIE BROWN Roger.
SNOOPY Okay, Charlie Brown, Snoopy. You want to give me a time hack on VERB 16065? Or your mission time. It doesn't matter.
CHARLIE BROWN Okay, Snoopy, time hack follows: 945317181920.
SNOOPY Okay, we're in good shape here. Until we get an update, it looks good. Let's go and give me VERB 059011706, see if that's changed and give me the numbers, please.
CHARLIE BROWN Roger. VERB 05901 three balls 12 1325633266.
SNOOPY Okay, Charlie, thank you.

SNOOPY Hello, Houston, this is Snoopy, over.

CAPCOM Go ahead, Snoop, Houston standing by.

SNOOPY Okay, if you have high gain lock, I'm ready for my E memory dump on page 33.

CAPCOM Snoopy, this is Houston. Put your updata link to data and we are ready for the E memory dump, over.

SNOOPY Okay.

SNOOPY Updata link to data and E memory dump coming at you, mark.

CAPCOM Roger, Snoop, we copy.

SNOOPY Hello, Charlie Brown, Snoopy.

CHARLIE BROWN Go ahead, Gene, this is John.

SNOOPY Okay, how are we doing? I'm ready to do that docked alignment if you are. How are you doing there?

CHARLIE BROWN Okay, I'm about ready.

SNOOPY Okay, John. When you get all squared away, we go in the minimum deadband attitude hold, hold the rascal tight and then on your mark, you can give me VERB 06 dump - why don't you just hold it until I get my alignment squared away.

CHARLIE BROWN Okay, I'm going to SCS and then deadband.

CHARLIE BROWN Okay, we're in mid-deadband.

SNOOPY Okay, if you're in deadband attitude hold and you're all settled down there, give me VERB 06 NOUN 20, we'll have at it, over.

CHARLIE BROWN Rog. VERB 06 NOUN 20 is 13807 20094 00055.

SNOOPY Okay, reading them back, number 1 13807, number 2 20094, number 3 00055, over.

CHARLIE BROWN That is correct.

SNOOPY Okay, hold it there and we will be at it.

END OF TAPE

CAPCOM Charlie Brown, this is Houston. We have your dap update pad when you're ready.

CHARLIE BROWN Roger, go ahead.

SNOOPY Okay, John, John, you can go ahead and release it, the minimum dead band we're all out on the course align and squared away.

CHARLIE BROWN Okay, go back to CMC in AUTO.

SNOOPY Okay, and real fast here, if you can give me a verb 06 noun 20 we'll mark it forward and call the ground on a fine align. Let me know and I'll give you the enter on verb 06 noun 20. Are you ready?

CHARLIE BROWN Okay, go ahead.

SNOOPY Okay, 3, 2, 1, mark it.

CHARLIE BROWN You got it.

SNOOPY Okay, ready it to me, babe.

CHARLIE BROWN Let's do another one, Tom. I was a little late on that one.

SNOOPY Okay, just a couple of seconds. Okay, counting you down, 4, 3, 2, 1, mark it.

CHARLIE BROWN Okay, plus 13801 plus 20067 plus 00048.

SNOOPY Okay, was the first one 138?

CHARLIE BROWN Right, plus 138.

SNOOPY 13801 plus 20067 plus 00048.

CHARLIE BROWN Right.

SNOOPY Okay.

SNOOPY Hello Houston, this is Snoopy.

CAPCOM Go ahead, Snoopy.

SNOOPY Roger, did you read out that John's verb 06 noun 10?

CAPCOM That's affirmative. We copied 13801 plus 20067 plus 00048.

SNOOPY Okay, and here are my gimbal angles. Plus 16070 plus 02023 plus 35973. Over.

CAPCOM Okay, Snoop, we got your plus 16070 plus 02023 plus 30 - correction plus 35973.

SNOOPY That is correct and we're still running about 35 to 45 minutes ahead of time. Over.

CAPCOM Snoopy, this is Houston. We would like you to check your T ephemeris. We think it's incorrect.

SNOOPY Okay, I'll recheck it. Thank you.

CHARLIE BROWN Okay, I got 3 balls 12 13256 and 33266, Tom.

SNOOPY And that's exactly what I monitored. If you can read my DSKY I've got it 3 balls 1213256 33266. Over.

CHARLIE BROWN Instant sock set.

CAPCOM Roger, Charlie.

SNOOPY Hello Houston. This is Snoopy. I'm going to jump way ahead and get my rate gyro check out of the way.

CAPCOM Roger, Snoop, we copy.

CAPCOM Charlie Brown, this is Houston. We're going to have to do a P52 and then repeat step 7 on your activation 35.

CHARLIE BROWN Okay, you've got to have a P52 first, huh?

CAPCOM That's affirmative.

SNOOPY Hey, C.B.

SNOOPY Hello Houston. This is Snoopy. I'm standing up here in the hatch. Do you want us to do a P52 right now or do you want us to start working on the hatch to get that out of the way? Over.

CAPCOM Snoopy, we want you to get the P52 in before we go LOS, which is going to be in 33 minutes.

SNOOPY Hello Houston, Houston, this is the LMP back in Snoopy.

CAPCOM Roger, we read you loud and clear, Geno.

SNOOPY Okay, Jack, I'm getting on my hoses here and I'll be with you in a second.

END OF TAPE

CAPCOM Charlie, this is Houston. Let's take an option 1 on that.

PAO This is Apollo Control.

SNOOPY - except the LM.

PAO We have 29 minutes left in this rev before loss of signal. We're a little more than halfway across the visible face of the moon in the 10th revolution.

SNOOPY Snoopy, I'm going to go ahead with the ascent battery activiation and checkout at this time, over.

CAPCOM Roger, we copy, Snoop.

SNOOPY Houston, the voltage on ascent batteries alone looks like it's about 30 volts apiece.

CAPCOM Roger, we copy, Snoop.

CHARLIE BROWN Houston, you got those gyro torquing angles, over.

CAPCOM We're copying them down. Stand by.

CAPCOM Okay, Charlie, we've got them.

CAPCOM Okay, Charlie and Snoopy, we've got some switches for you to check on the VHF-B comm situation.

CHARLIE Roger, go ahead.

CAPCOM Okay, for Charlie Brown, this is VHF AMA simplex basic check. Your VHF-AMA switch in simplex, VHF-AMB in off, VHF-AM receive only in off, VHF ranging off. And for Snoopy, VHF transmitter A to voice, VHF receiver A to on, and on the commander's audio side the VHF-A transmit receive to TR.

SNOOPY Okay, for Snoopy, that was VHF-A transmit voice receiver on and what was the last one?

CAPCOM VHF receiver A to on, and on the commander's audio side, the VHF-A TR to TR and check all circuit breakers in.

CHARLIE BROWN Roger. That was the setup I had there.

CAPCOM Roger, thank you, John.

SNOOPY Hello, Charlie Brown, Snoopy. How do you read me on VHF-A simplex?

CHARLIE BROWN I read you same as before, Tom, which is unreadable.

SNOOPY John, do you read me any better?

CHARLIE BROWN Negative.

CHARLIE BROWN I can hear you through the tunnel.

SNOOPY Okay, but you don't hear me any better, okay.

CAPCOM Snoopy and Charlie Brown, this is Houston. We're ready for you to do step 7 on your coarse align procedure.

SNOOPY Okay, John, how do you read now?

CHARLIE BROWN (Garble) Snoopy.

CHARLIE BROWN Okay, we're going to have to go back to - go ahead, Tom.
SNOOPY Okay, John.
CHARLIE BROWN Are you on duplex B, Tom?
SNOOPY VERB 06 NOUN -
CHARLIE BROWN - simplex A?
SNOOPY - and I'll count you down, okay?
CHARLIE BROWN Hey, Tom, are you on simplex A or B?
SNOOPY John, let's don't fool with them. We'll go on to B and get this stuff out of the way.
CAPCOM Charlie, this is Houston. They want you to go to simplex B.
CHARLIE BROWN Okay, how do you read now?
SNOOPY John, I'm reading you loud and clear. How do you read me, over.
CHARLIE BROWN I don't read you.
SNOOPY John, do you read me on simplex B.
CHARLIE BROWN Yes, loud and clear.
SNOOPY Okay, John, we've got it now. Let's go ahead with VERB 06 NOUN 20 and tell me when you are ready and I will count you down, over.
CHARLIE BROWN Okay, go.
SNOOPY Okay, 3, 2, 1, mark.
CHARLIE BROWN Okay, +13552 -

END OF TAPE

SNOOPY Over.
CHARLIE BROWN Okay, go.
SNOOPY Okay, 3, 2, 1, Mark.
CHARLIE BROWN Okay, plus 135 52, plus 193 71, plus 00 132.
SNOOPY Okay, I've got all those. Plus 13552, plus 19371, plus 00132, over.
CHARLIE BROWN Right.
SNOOPY Okay, Houston, this is Snoopy. Ready to copy my angles? Over.
CAPCOM Go ahead, Snoop.
SNOOPY Okay, my angles are 0620, plus 012. Pardon me, my first register plus 16354, plus 01299, plus 35901, and I assume that you copy John? Oh, pardon, that's 35906 on the last register.
CAPCOM Okay, Snoopy, we copy John and then on yours we got plus 16354, plus 01299, plus 35906.
SNOOPY That's correct, thank you.
SNOOPY And Houston, this is Snoopy. The ascent batteries look good; the backup and normal feed is good; and my ED voltage is 37 on A and 37 on B.
CAPCOM Roger, we copy. 37 on ED's.
SNOOPY Charlie Brown, Snoopy. Our next step here is we got to have the hatch closed so I'll stand by to help you with the probe and drogue when you're ready, Babe.
CHARLIE BROWN Roger.
SNOOPY Houston, this is Snoopy. How about giving me the next LOS and the next AOS time, please?
CAPCOM Okay, Snoopy, your next LOS will be at 95:40, and your next AOS will be at 96:27, and I have some LM gyro torque angles for you.
SNOOPY Stand by half a second. Okay, go ahead with the LM gyro torque angle.
CAPCOM Okay, LM gyro torque X, minus 00730; Y, minus 00700; Z, plus 00570.
SNOOPY Okay, I got X, minus 00730; Y, minus 00700, and Z is plus 00570. Is that correct?
CAPCOM That's affirmative. You've got them right. There's one more thing we can try on our VHF situation. We may have the corona built up on our VHF A transmitter, so VHF A transmitter switch OFF for several seconds and then back to voice, over.
SNOOPY I don't think that will work, Jack. When we just tried it again it had been in the OFF position. I put it to voice. We'll give it a try here in a minute though.

CAPCOM Roger.
SNOOPY I was suiting up while this COMM problem started. Is it a VHF A Simplex mode?
CAPCOM That's affirmative. Unable to transmit Snoopy to Charlie Brown on VHF A.
SNOOPY Okay, that sort of blows the ranging capability, doesn't it?
CAPCOM That's affirm.
SNOOPY Houston, this is Snoopy. While they're closing off the probe, and drogue, and hatch, I'll copy some of those updates, burn update times, if you got them.
CAPCOM Roger, stand by one, please. Okay, Snoopy, we have these burn times They're nominal burn times; they'll change a little bit either way. Separation is at 98:47:16, DOI 099:46:0 -

END OF TAPE

CAPCOM a little bit either way. Separation is 984716. DOI 0994602. Phasing 10058 ...
SNOOPY Wait a minute, Jack, wait a minute. Wait a minute. Wait a minute. I can only copy them down one at a time. I want to copy them right in the book. Now go on with DOI.
CAPCOM Roger, 0994602. Over.
SNOOPY Okay, go on with phasing.
CAPCOM Okay, phasing is at 1005825.
SNOOPY Okay, insertion.
CAPCOM Insertion is at 1025437.
CAPCOM And Charlie Brown, this is Houston.
SNOOPY (garbled) that's all we need right now, huh?
CAPCOM Charlie Brown, this is Houston. Your roll jets to disable, please.
CHARLIE BROWN All roll jets - wait - wait a minute, we'll - okay, we'll disable the roll jets. Did we maneuver to the landmark tracking attitude with just the probe holder?
CAPCOM Stand by.
CHARLIE BROWN We haven't released the capture latches yet, Jack.
CAPCOM Roger, stand by.
CHARLIE BROWN Houston, this is Charlie Brown. Over.
CAPCOM Go ahead, Charlie.
CHARLIE BROWN Roger. What's the answer to that one?
CAPCOM Okay, the answer to it is that as soon as the tunnel is vented you can use your roll jets. Over.
CHARLIE BROWN Roger, why don't we just maneuver to the attitude first, then, and then free load the drogue, then release the latches.
CAPCOM Charlie, this is Houston. Stand by one on rolling to the landmark track attitude. We'd like to update the LGC clock. Over.
CAPCOM And we'll give you a GO when you can maneuver to the attitude.
CHARLIE BROWN Roger. Roger, I'll go in there and release the latches then.
CAPCOM Snoopy, Houston. We'd like you to put your update link switch to data, please.
SNOOPY Okay, it is in data.
CHARLIE BROWN Hey, Gene, you guys want to put your helmets and gloves on and release these latches?
SNOOPY Yes, I'll give you a call when we get them on, John, before you release them.
SNOOPY Okay, Charlie Brown, we've got helmets and gloves on. You can open the latches.

SNOOPY Charlie Brown, this is Snoop, do you read?

CHARLIE BROWN Roger, just a second.

SNOOPY Okay, and we're closing our hatch at this time.

CHARLIE BROWN Okay, and I'll disable the roll jets here.

CAPCOM Snoopy, Charlie Brown, this is Houston. Our uplink is complete and you have a GO for a maneuver to the landmark tracking attitude, and we have to have the OPS source pressure. Over.

SNOOPY Stand by one.

SNOOPY Okay, Houston, this is Snoop. I am at 5800 on both OPS's this morning when I came in.

CAPCOM Roger, Snoop, we copy, 5800.

END OF TAPE

SNOOPY - 5800 on both OPS's this morning when I came in.

CC Roger Snoopy; we copied. 5800 Snoopy, this is Houston; we are 1 minute from LOS; I recommend you lock your high gain antenna; over.

SNOOPY Roger; thank you.

PAO This is Apollo Control. We've had loss of signal as the Apollo 10 spacecraft went behind the moon in this 10th revolution. We've got about 45 minutes, 15 seconds until acquisition of signal again. We've got about 14 minutes of color video tape to play back from the May 21st TV feed from the spacecraft to the Madrid tracking station, which was video taped there and the tape flown to this country for a play back, and it was not relayed in real time. We'll roll this tape now.

SC Interior wise, we're giving them a look at the star chart which has got some colors of both the earth, the sun, the moon and some of the planets - Saturn, Jupiter, Venus, Mars.

CC Roger.

CC How about putting that pretty patch back up there again?

SC Okay, we'll do that. Tell them this is our star chart and how we identify the stars and the planets we are looking at right now. This is what we use for star navigation; the earth is over here - go ahead.

CC Roger - our signal's down about -

SC Go ahead Houston; this is 10.

CC Roger Geno. Our signal is down about 10 DP, we'd like you to go high-gain to medium width and then back to narrow; over.

SC Okay, it's medium and I'll go back to narrow.

CC Roger.

SC How's that?

CC Stand by.

SC Okay - the blue ball here, the big one is the earth as it progresses through the - through the heavens here while we're on this trip. The moon is in yellow, and it also progresses through the heavens. Might bring out that famous Apollo 10 simple patch.

CC Roger; we'd like to - wish we were seeing this now but Madrid is going to record it for us, and then 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 closer there Charlie if I told you about that.

CC Roger.

CC Takes me a little while to catch on to those things.
SC Where better can you give an astronomical description than in an astronomical heaven, huh?
CC (Laughter.)
SC I think that's where we are. This PTC REFSMAT really helps you with your orientation of the stars, even if you can't see it, you can kinda feel from where they oughta be, which I think is gonna help us out.
CC Roger, 10; we are still having a problem; we'd like you to go to wide beam for 30 seconds and then back to narrow. Over.
SC Okay - we're in wide beam.
CC Roger; we'll probably lose the TV for a little while; we'd like you to keep going, the next time around, and maybe we can get a better picture; Madrid is having a little bit of trouble.
SC Charlie, you wouldn't believe this, but right now outside my window, I've got something, I don't know how far, I assume it might be the SIVB, just spinning around and reflecting sunlight out there.
CC Roger - if we can get our expert Fido's going and see how far the SIVB should be right now from you.
SC I can see it with the naked eye and I put the monocular on it and I can see it spinning around and I wouldn't bet my life on it being the SIVB, but it sure has gotta be something like it.
CC Roger; we hope so. We'd like you to go back to narrow beam width now, 10.
SC Roger; we're back in there now Charlie.
CC Okay, and we're getting great signals from you now so we should be in great 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.
CC 10; Houston. Madrid is reporting a much better picture now, so we fixed it up.
SC Okay - the -

END OF TAPE

CAPCOM 10, Houston. Madrid is reporting a much better picture now, so we fixed it up.

SC Okay, the earth ought to be coming through my window here in a minute, Charlie, if you will stand by.

CAPCOM Roger, we're standing by.

CAPCOM 10, Houston. E-comms are saying that it looked like we locked up on a side load there with - the first time 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 narrow, over.

SC Okay, we're all right now, though.

CAPCOM Rog, 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.

SC Okay, now we've got it, Charlie.

CAPCOM Roger. We've got about - still about a minute.

SC That's a good picture of the moon.

CAPCOM Rog, Madrid has got it.

SC Okay, Charlie, ... I can see all of Africa and as a matter of fact, I'm look right down at Madrid.

CAPCOM Roger, we're beginning -

PAO Madrid is receiving TV.

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 area ought to be getting a good picture of themselves right now.

CAPCOM Rog.

CAPCOM I think they can broadcast that stuff out - I was just going to say, 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 transmitted back in the color for the people in that area, but they are probably seeing it in black and white.

SCWell, it's a beautiful sight. All

of Africa is brownish, of course, and the waters are very, very blue.

CAPCOM Can you differentiate between the -

SC ... go ahead, I'm sorry.

SNOOPY Charlie, the picture just went out beyond the corner of our window now, so it looks like that's about it for right now.

CAPCOM Roger.

SNOOPY And what did you want me to differentiate between?

CAPCOM I was just going to ask you. Looking at Africa -

SNOOPY What was your question now?

CAPCOM Okay. Looking at Africa, could you tell the difference between the Congo and the tropical forest and the mountains around Morocco and all the -

PAO This is Apollo Control. That completes the playback of the tape from the Madrid pass of yesterday. Color TV being converted here in Houston, received in black and white at Madrid, the video tape flown here for conversion. The quality of the color was less that what we've seen earlier with the color TV passes. Ran about 14 minutes. Correction on that, it was day before yesterday. One tends to lose track of time. We're some 30 minutes 44 seconds away from acquisition of signal on the 11th revolution in lunar orbit. Coming up on this next revolution will be a GO/NO-GO from Mission Control for undocking and separation, just toward loss of signal of the 11th revolution. Acquisition will be at 96 hours 27 minutes and will end at 97 hours 30 minutes, on revolution 11. And at 95 hours 57 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 96 hours 27 minutes ground elapsed time. We should have acquisition now with Apollo 10 coming on the front side of the moon in revolution 11. During this rev the crew of Apollo 10 will be preparing for undocking the lunar module from the - there goes a call now.

CHARLIE BROWN Houston, Charlie Brown. Over.

CAPCOM Roger, Charlie Brown, read you -

CHARLIE BROWN I checked the vent valve and -

CHARLIE BROWN Roger, I say again, we can not get the tunnel to vent. Over.

CAPCOM Roger, understand, tunnel will not vent.

CHARLIE BROWN That's correct. We've checked the in pull valve, I've checked the in flow valve, I've checked the vent valve and Tom and Gene have checked their auto valve and their hatch seal around the hatch and they feel some pressure inside their (garbled) and it doesn't appear to be leading into the tunnel, so I don't know what the problem is. Possibly some of that insulation has gotten lodged in the vent line maybe.

CAPCOM Roger, we copy. Stand by.

CHARLIE BROWN This is Charlie Brown. Do you read? Over?

CAPCOM Roger, we read you 5 by, about 3 by, Charlie Brown. We copied that the tunnel will not vent so we are working on the problem now. Stand by.

CHARLIE BROWN (garbled)

SNOOPY Houston, this is Snoopy, how do you read?

CAPCOM Snoopy, this is Houston, we read you about 2 by.

SNOOPY Okay, the whole thing (garbled)

CAPCOM Snoopy, Houston, you are unreadable. We copied a few words about the (garbled) that the tunnel will not vent. Otherwise, that is all we can copy. Over.

SNOOPY Hello Houston, how do you read Snoopy now?

CAPCOM You're about 2 by still, Gene.

SNOOPY Okay. If we have to we would like to go ahead and try and vent the tunnel through the LM. We will depressurize the LM on our way inside (garbled)

CAPCOM Roger, stand by.

SNOOPY Garbled.

CAPCOM Hello Snoopy and Charlie Brown. We recommend you skip the landmark tracking and jump to a high gain antenna attitude. Over. We'll have you some angles momentarily.

CAPCOM Hello Charlie Brown, Houston. If you maneuver to a 000 roll, 014 pitch, and yaw 000 and get

CAPCOM into high gain your angles are good in the flight plan. Snoop, your angles are good as listed in the flight plan at 97 hours. Over.

SNOOPY Snoopy, Roger, understand.

CHARLIE BROWN (garbled)

SNOOPY He said if you maneuver (garbled)

CAPCOM Roger, Snoop, your angles are 193 yaw 64 degrees on the high gain antenna when Snoopy - correction, when Charlie Brown gets the attitude.

SNOOPY My flight plan (garbled)

SNOOPY Houston, repeat up to me where you want Charlie Brown to maneuver to. He can't read you. In the angles.

CAPCOM Roger, Snoopy, we want Charlie Brown to maneuver to 000 roll, pitch 014, yaw 000. It's listed in the flight plan at 96 hours and 40 minutes. Over. Skip the landmark tracking.

SNOOPY (garbled)

SNOOPY Say, I asked you what angles (garbled)

CAPCOM Charlie Brown, Snoopy let us know when you get there.

SNOOPY Oakie doak. This way we can get high gain so we can get our state vector update and continue on. We can't do much without that state vector.

CAPCOM Roger, Snoop, we copied about - we see Charlie Brown maneuvering to high gain attitude. Stand by on the tunnel vent, over, we're coming up with a procedure for you.

SNOOPY Okay, great, thank you.

CHARLIE BROWN Okay, Tom, LM time is going to be about 360, right at 606 36 30 and roughly 40 above 400, right?

SNOOPY Yep. Hey, how come you're feeding on the VOX through feed loop? Are you VOX?

CHARLIE BROWN No, we got a hot S-band mike when we're in ICSPPT and down voice backup.

SNOOPY Okay.

SNOOPY I just left it there right now.

CHARLIE BROWN All right. (garbled) full power when we can.

SNOOPY (garbled) yes.

SNOOPY Okay.

SNOOPY Okay, babe.

CHARLIE BROWN (garbled)

END OF TAPE

CAPCOM Snoopy, Houston.
SNOOPY Go ahead, Houston, this is Snoopy.
CAPCOM Rog, Snoopy, you are coming about 3 by now, Tom. When we get high gain lock up, we would like voice with the ranging off, over.
SNOOPY ... back up ranging off.
CAPCOM Roger, and in downvoice backup master, if you turn the ranging off, we'll probably improve the voice quality some, over.
SNOOPY Okay, Charlie, I've got the ranging off.
CAPCOM Rog. You're a little bit better. Charlie Brown, I understand you are calling. Go ahead, over.
SNOOPY Hello, Houston, this is Snoopy. How do you read? Over.
CAPCOM Go ahead, Snoop, over.
SNOOPY Okay, Charlie. Look, as far as we can see, it still appears to us like all of this mylar floating around in the spacecrafta has probably got down into that vent line. The only solution we can see about it is we vent the tunnel and take it out through the LM and take us down. With Charlie Brown no good, it will stuff that mylar right back into his valve - tunnel valve, which is no good. how, We'll have a rough riding command module but if we did do something we could live with the LM for a while. That's about all we can see. But as far as we understand about the probe, it's probably not a good idea to release the probe until we're pressurized, over.
CAPCOM Roger, 10, correction roger, Snoop. We're aware of that. We will probably come up with that solution. The only thing about releasing the probe without doing a hatch integrity check, we are a little concerned about that. If you will stand by a couple of minutes, we will come up with a procedure for you for venting the tun-nel, over.
SNOOPY Okay.
CHARLIE BROWN Houston, Charlie Brown. How do you read?
CAPCOM You are coming about 3 by, John.
CHARLIE BROWN Roger, and I think we're all clear now.
CAPCOM Okay, you're coming about 4 by. You're picking up all the time.
SNOOPY Houston, how is Snoopy on high gain?
CAPCOM Snoopy, you are 5 by. Stand by.
SNOOPY How is Snoopy on high gain?
CAPCOM You're 5 by, Snoop. Stand by.
CHARLIE BROWN Okay, Snoopy, do you want to do another LM drift check now?

SNOOPY Rog. We will do it while they are still figuring what their recommendations are. John, on my mark, let's do a VERB 06 NOUN 20. We will try to keep ahead of it while we can.

CHARLIE BROWN Roger, go ahead.

SNOOPY Okay, counting down on VERB 06 NOUN 20, 3, 2, 1, mark.

CHARLIE BROWN Roger, + two balls, 167 + 01380 + three balls 94.

SNOOPY Roger. 0016701380000094, over.

CHARLIE BROWN Got them.

SNOOPY Rog.

SNOOPY Okay, Houston. My reading 0620 + 30186 + 19360 + 35913, over.

CAPCOM Roger, we copied. Snoop, Houston. We'd like to uplink - send a load for you, if you will give us POO in data and we will have some word on the tunnel procedure momentarily, over.

SNOOPY Roger, we're in POO and data. You've got it.

CAPCOM Rog.

CHARLIE BROWN Houston, this is Charlie Brown. I never did get that DAP load. You got one for me? Over.

CAPCOM Roger. We've got it here for you, Charlie Brown, if you are ready to copy, CS -

END OF TAPE

CHARLIE BROWN Houston, this is Charlie Brown. I never did get that DAP load. You got one for me? Over.

CAPCOM Roger, we got it here for you, Charlie Brown, if you're ready to copy. CSM weight is 36688; gimbal trim, pitch minus .73, yaw plus .82; LM weight, 31117. Over.

CHARLIE BROWN Roger, CSM weight, 36688; minus 73, plus 82; LM weight, 31117.

CAPCOM Roger.

CHARLIE BROWN How do you want DAP set up today to balance these quads?

CAPCOM Stand by. Use a BD roll, Charlie Brown.

CHARLIE BROWN Say again, over.

CAPCOM Roger, use BD roll.

CHARLIE BROWN Roger, use BD.

SNOOPY Houston, Snoop. Are you done?

CAPCOM That's negative, Snoop.

SNOOPY Never mind, I can see you're not. Have you got our DAP load on page 45?

CAPCOM That's affirmative. Coming up to you now. CSM weight, 36688; LM weight, 31117, over.

SNOOPY Rog, LM is 31117; CSM is 36688, and understand the 501 and the 547 are still good.

CAPCOM Affirmative. Stand by, we'll be right with you, Snoop, on the procedures.

SNOOPY Okay, as soon as we get our log - Okay, we're going to proceed as soon as we get the computer back to updating the AGS and going through the gimbal check until we hear from you.

CAPCOM Roger, we concur.

CAPCOM Snoop, Houston. We got just one more load to go and then we'll have it for you, over.

SNOOPY Okey doke.

SNOOPY Hello, Charlie Brown, Snoop.

CHARLIE BROWN Go ahead, over.

SNOOPY On that VHF A, was your squelch all the way off?

CHARLIE BROWN That's affirmative.

SNOOPY Okay.

CHARLIE BROWN I had to squelch up and down when you guys were transmitting. I couldn't do any good either way.

SNOOPY Okay.

CAPCOM Hello, Snoop, Houston. We are through with the load. The computer is yours. Charlie Brown

and Snoop, if you're ready to copy, we have a procedure for you for your tunnel vent over.

CHARLIE BROWN Roger, Go ahead.

SNOOPY Go ahead.

CAPCOM Roger, Snoop. On activation 38, we want you to do, to vent the tunnel using the normal regulator check with the following exceptions. Are you ready to copy? Over.

SNOOPY Go ahead.

CAPCOM Okay, we assume you've gone through the regulator checks so we're going to shorten this procedure. In step 2, step 2 on activation 38, line 2, verify overhead cabin dump valve, we want that open. Cabin repress to close. Activation page 39, step 3, the forward cabin dump valve open then auto at three and a half psi. Now that will give us a one and a half DELTA P in the tunnel, and at this time the CMP should be monitoring the LM/CM DELTA P. Now, all we're concerned about is the hatch integrity check for the command module using this procedure. We don't have to take the tunnel all the way down. Now we will have to eliminate any RCS hot fire, the yaw thruster firing, and we'll get that out of the way after undocking. Over.

SNOOPY Okay, I think we got it, Charlie. On page 38, step 2, verify overhead cabin dump valve to open instead of auto; cabin repress to close on step 3; opened at auto at 3.5; and we will restrict the yaw firing thruster as you're concerned about the command module hatch integrity check, and for us to assume that when he releases the probe, that the 3 and a half psi will not hurt the probe, over.

CAPCOM That's affirmative. We've run that through the experts, Tom, and it will not hurt the probe or the drogue. In repressurizing, don't forget to put the overhead dump valve, overhead dump valve, back to auto when you repress, over.

SNOOPY Oh yeah, we know all about that, Charlie.

CAPCOM Okay, oh you just pressurize the tunnel back up again -

SNOOPY Okay, we're ready to go through it - we're ready to go. Right, we're ready to go ahead through it right now when John's ready.

CAPCOM Roger, now, we'd like you to sta -

CHARLIE BROWN Okay, let me get up here in the tunnel there, Tom.

CAPCOM Okay, troops. Now we'd like you to stay at about 3 and a half for a couple of minutes so we can get a hatch integrity check in the command module, over.

SNOOPY Roger.
CHARLIE BROWN Okay, go ahead, Tom. What position do you want me to be on the tunnel? Do you want me on CM DELTA V?
CAPCOM That's affirmative.
CHARLIE BROWN Okay, go ahead, Tom. Are you all doing the checks, you guys?
SNOOPY Stand by; keep in touch.
SNOOPY We're starting it off right now, John. I'll give you a hack when we're going down.
CHARLIE BROWN Thank you.
CAPCOM Snoop, Houston. It would give us a warm feeling if you could talk us through this.
SNOOPY Okay, cabin gas return egress. How do you read me VOX, Houston?
CAPCOM Reading you 5 by, Snoop.
SNOOPY Cabin gas return - wait a minute, wait a minute - Start here, Babe, or back here? Okay, Houston, I'm starting on 9605, step number 2. Is that correct?
CAPCOM That's affirmative. Before you get started we want both press rigs A and B to egress, over.
SNOOPY Both press rigs A and B to egress.
SNOOPY I've got them egress. Let's go.
SNOOPY Roger, they're egress.

END OF TAPE

CC over -
SNOOPY Both press regs A and B to egress. I don't need that; let's go. Roger; they're egress. Cabin gas return egress. ... overhead cabin dump valve OPEN. OPEN?
CB That's affirmative.
SNOOPY Okay - cabin repress CLOSED.
CHARLIE BROWN Go.
SNOOPY Got it closed?
CHARLIE BROWN Affirmative.
SNOOPY Press reg B egress. B Bravo. Okay?
CHARLIE BROWN Okay - forward cabin dump valve and in AUTO at 3.5 - why don't you get that Tom and I'll tell you when.
SNOOPY Okay - I'm reading a minus a half PSI on my CM LM pressure gage right now.
CHARLIE BROWN Houston, where is the suit gas diverter valve on this?
CC Suit gas diverter valve should be in EGRESS.
CHARLIE BROWN Should be right. That's what we figured; okay. Just to verify - we got pressure reg A at egress and pressure reg B at egress, is that correct?
CC Affirmative.
CHARLIE BROWN Okay, we're gonna start dumping the cabin down to 35.
CC Rog -
SNOOPY Do it slowly babe. Okay, there's 5.
SNOOPY Okay, I have a half a PSI.
CHARLIE BROWN 4 - 5 4 - 2
SNOOPY I have 1 PSI.
CHARLIE BROWN 4 - 0 3 - 8 ... hold it 3- 5 stop it Tom. Okay, we're down to 3 .. 4 - 2.
SNOOPY We have 1 and a half PSI.
CC Roger, Snoop, we copy. 3 and a half PSI, and we copy Charlie Brown, 1 and a half PSI. Let's hold for a couple minutes to get an integrity check Charlie Brown; watch your cabin pressure, over.
CHARLIE BROWN I'm watching her.
SNOOPY This is like spring in Chicago in here; there's snow all over the place.
CC Roger.
CHARLIE BROWN Hey Tom, I'm going ahead with the AGS bit while I can. Okay, what's you guys' pressure there?
CC Hey Snoopy, you're holding at 3 and a half.
SNOOPY Okay. I think it's starting to build up We can let the tunnel pressure go. Yeah, it started to go up before.
CHARLIE BROWN Okay, mine's down to 1 now.

SNOOPY Houston, did you read Snoopy, our pressure went from 3 and a half up to 4, and then Tom just closed the overhead dump valve.

CC Roger.

CHARLIE BROWN Okay - mine's holding at 1 right now. That's because they built theirs up I guess.

CC Alright Charlie Brown and Snoop; we are satisfied with the hatch integrity check and the CSM. Now, before - Snoopy - before you repressurize, go to cabin gas return to CABIN. Over.

SNOOPY Roger; cabin gas return to CABIN.

CC Okay, you can start repressurizing now and we'd like to get you a - when you get back into configuration we'd like a hatch integrity check for you too.Over.

SNOOPY Boy our cabin gas return to AUTO is what you want, isn't it?

CC That's affirmative.

SNOOPY Okay, and we are ready to repress I guess, at this point.

CC Roger. Go.

SNOOPY Okay, Houston, we are up to 5.

CC Roger.

SNOOPY Okay, do you have a procedure for us on the integrity check?

CC Say again Snoop.

SNOOPY Are you gonna pass us up a procedure for a hatch integrity check?

CC Negative; just get in configuration and if you hold pressure, that's good enough for us.

SNOOPY Well we're okay.

CC Okay, fine, you can press on. Over.

CC Snoopy, Charlie Brown, only thing is reminder press rigs A and B back to CABIN; over.

SNOOPY Roger; we'll get them Charlie.

CC Roger.

CHARLIE BROWN Okay, we're maneuvered back to the attitude this time, Tom - we're gonna be a little more rigorous now.

CC Charlie Brown, Houston. Two things for you. We'd like another read out on your LM CM Delta P, and also disable all roll jets over until we can get undocked.

CHARLIE BROWN Roger. All roll jets coming OFF and LM CSM Delta P is .9.

CC Roger.

SNOOPY Houston, this is Snoop. I gave the AGS an update and an alinement and then when I checked verb 83, my local/vertical angle goes off by about 20 degrees so I am going through the procedure again.

CC Roger, and we have a K vector update for you; over.

SNOOPY Okay, fire it.
CC Roger - 090 00 03 00.
SNOOPY 090 00 03 00?
CC Affirmative.
CC Snoopy - Charlie - this is Houston. We'd like to - we got a little problem with your gyro platform as it appears and X gyro torquing angle is a little large; we'd like you to repeat the drift check; over.
SNOOPY Okay, you want to repeat the drift check; roger; give us a second here.
CC Roger, that's on page 43.
SNOOPY When I load in the K vector, I just load it in verb - in 90, don't I. Huh?
CC Charlie Brown, Houston. We'd like one more readout of the LM CM Delta P; over.

END OF TAPE

CAPCOM Charlie Brown, Houston, we'd like one more readout of the LM/CM DELTA-P. Over.

CHARLIE BROWN Roger. And 48.

CAPCOM Roger.

CAPCOM Snoop, Houston, we copied you entered the K factor wrong. We need 90 hours and 3 seconds, not 30 seconds. Over.

SNOOPY Okay, 90 hours and 3 seconds, my mistake.

CAPCOM Charlie Brown and Snoop, we have 30 minutes to LOS. If we don't get the RCS hot fire in we're still GO for undocking. You can do that on the back side. Over.

SNOOPY Roger, what's the latest time for undocking now, Charlie?

CAPCOM Stand by.

CHARLIE BROWN Tom, you go ahead and get that through.

CAPCOM Snoop, Houston, undocking time is 98:22. You've got an hour and 4 minutes. Over.

SNOOPY Roger, 98:22:00.

SNOOPY Charlie Brown, Snoop, we're ready to do another one of those flip checks. Let me know when you have Verb 06 Noun 20. I'll give you a mark when to enter. Over.

CHARLIE BROWN Go, over.

SNOOPY Roger 3, 2, 1, mark.

CHARLIE BROWN Okay, plus 00393 plus 01300 plus 0428.

SNOOPY Roger, copied you. 00393 01300, and it's 0428, we need one more number.

CHARLIE BROWN 00428.

SNOOPY Okay, got it

CAPCOM Snoopy, Houston, let me read you an angle that we got and see if they confirm. You ready to copy?

SNOOPY Go.

CAPCOM Roger. For the CSM it's plus 00393 plus 01300 plus 00428. For the LM plus 29959 plus 19285 plus 35578. Over.

SNOOPY Houston (garbled)

CAPCOm Snoop, Houston, somebody cut in on us here on the loop. Did you copy those angles?

SNOOPY Roger, I copied them and they look correct. We're going to go ahead and go through the DAP throttle set here.

CAPCOM Roger.

CHARLIE BROWN Say, Tom, circuit breaker (garbled) control (garbled) power closed.

SNOOPY Flow control, auto.

CHARLIE BROWN Okay, Houston, Charlie Brown here.
CAPCOM Go ahead.
CHARLIE BROWN Looks like guidance control PGNCS.
SNOOPY Roger, what about not rolling to this 180 degree roll until we get undocked. Will that be all right?
CAPCOM Stand by.
CHARLIE BROWN I don't know how I'm going to roll with the roll jets disabled.
CAPCOM Roger, we copy, John. Stand by. We're running this one around the room, and I've got a SEP pad if you're not busy.
CHARLIE BROWN Go to it, over.
CAPCOM Roger, SEP, it's RCS G&N and it's NA down to Noun 33, and we've got 098471600 NA down to the pitch angle 014 degrees. Over.
CHARLIE BROWN Roger, 098471600, 14 degrees pitch.
CAPCOM Good readback, Charlie Brown.
PAO This is Apollo Control. The change of shift news conference has been delayed. We do not have an estimate at this time.
SNOOPY PGCA coming up to 40 percent.
CAPCOM Roger.
SNOOPY (garbled) now max throttle, (garbled)
CAPCOM Roger, we copy.
SNOOPY Good.
CAPCOM Roger, we copy, and Charlie Brown, we noticed when you went through your dap load you did not update your gimbal trims and they are quite a bit off. Over.
CHARLIE BROWN Okay, I'll fix them.
SNOOPY This is Snoopy. How's that for a K factor time?
CAPCOM Stand by.
SNOOPY Okay, if it's a good K factor time it's going in.
CAPCOM Okay, the K factor is good.
SNOOPY Okay, Tom, you got engine arm off, (garbled) power open, Auto control auto, the VHF -
CAPCOM Charlie Brown, Houston, if you can give us a POO in accept we've got the load for you.
SNOOPY I'm down to page 47. I did every-thing up here, Tom.
CHARLIE BROWN You have it.
CAPCOM Roger.
SNOOPY Yes, I got all the RCS pressure ...
SNOOPY (garbled)
SNOOPY ... arm's on, helium pressure RCS fire.

SNOOPY Goodbye, baby.
SNOOPY Hey, there's helium pressure kick out slightly.
CHARLIE BROWN Where did it go?
SNOOPY Hey, we're going at pressurization (garbled).
SNOOPY Okay, recycle. Let me recycle these valves. Half of the damn things (garbled)
CHARLIE BROWN Hey, Snoop, you know you're transmitting.
SNOOPY I know it. Okay, verify Masler Arm off and RCS Reg. A and B warning lights are off.

END OF TAPE

CHARLIE BROWN Hey, Snoop, do you know you're transmitting?

SNOOPY I know it.

SNOOPY Okay, verify master arm off and RCS regs A and B warning lights are off.

SNOOPY Verify the pressures and temperatures in the RCS and they are all go. And Houston, this is Snoopy. Our helium pressure on both RCS rings is 3900 psi.

CAPCOM Roger.

SNOOPY ATP, let me - stab control ... ... attitude, direct control closed on your side.

SNOOPY I can control PGNS, that's all, deadband max translation four jets. Control PGNCS attitude hold. Attitude control three pulse jet commander disable, PA is enable.

SNOOPY Hey, Charlie Brown, this is Snoopy. - call for you to be in a mid-deadband attitude hold.

CHARLIE BROWN Roger, give me a second.

CHARLIE BROWN Okay, in low, you got it.

SNOOPY Okay, we are going to start your RCS checks. We will give you a hack when we go hot fire.

CHARLIE BROWN Okay. Remember I don't have any roll jets.

SNOOPY Roger and we will not yaw.

CAPCOM Charlie Brown, you can have your computer back. We're through with your load and we are with you, Snoop, on the hot fire.

SNOOPY Okay, Charlie.

SNOOPY Okay, these are all cold fire. ... roll right.

SNOOPY Okay, try rolling right again.

SNOOPY Houston, are you reading these numbers?

CAPCOM Roger, we read them.

SNOOPY - pitch down. Yaw right.

SNOOPY Yaw left.

SNOOPY Okay, John, you can go to wide dead band attitude hold. Houston, what do you make out of that?

CHARLIE BROWN Roger.

CAPCOM Stand by. I think we're okay. Stand by.

SNOOPY Houston, we will stand by for your go until we proceed further.

CAPCOM Roger, stand by. And Charlie Brown, we show you in the DAP min deadband, over.

CHARLIE BROWN That's right.

SNOOPY Charlie Brown, you can go to wide deadband for us now, attitude hold.

CHARLIE BROWN ... undocking ...

SNOOPY Rog. We haven't begun the day yet.

CAPCOM Snoopy, we're go with those numbers in the cold fire, go ahead with the min impulse, step 5.
SNOOPY Okay, real good. We'll go ahead. That's the first time we've seen numbers that have gone to the full range. I ... ... with them, the whole analysis ... ..., but, okay, we'll go ahead.
SNOOPY ... AGS.
SNOOPY AGS attitude hold.
SNOOPY The attitude control, ...
CHARLIE BROWN Okay, your commander's ... been enabled.
CAPCOM Charlie Brown, Houston. We would like you in wide deadband, over.
SNOOPY - hot fire.
SNOOPY Charlie Brown, let us know when you get in wide, because some - hot fire.
CHARLIE BROWN Okay, we're in wide.
SNOOPY Okay, we are now proceeding and we will let you know when we hot fire here. E-comm, we don't want any ..., is that right?
SNOOPY Okay, roll right and, John, you'll get a pulse of hot fire.
CHARLIE BROWN - roll, pitch up, roll, pitch down.
SNOOPY Okay, thrusters seemed nice and crisp. They were real good.
CHARLIE BROWN Okay, you want to yaw right and left without going to the hard spot?
SNOOPY No. -
CHARLIE BROWN Okay, attitude control three pulse. Okay, get your four GDA breakers in and I'll get mine in. All in?
SNOOPY Okay. We open (garble) all the lights are off, all the flags are off. This is the hot fire in the AGS. (garble) Okay.
SNOOPY Up, down, right left, and then fore and aft. Charlie, you ready for a hot fire?
CHARLIE BROWN Go ahead.
SNOOPY Okay, up, out, right, up, over, aft. I guess they all fired, babe.
SNOOPY They all fired, Houston, but we didn't get it on the DSKY because they made a real short pulse.
SNOOPY You wouldn't get them anyway. This is AGS, babe, we weren't -
SNOOPY Yes, right.
CAPCOM Roger, Snoop, we copy. Charlie Brown, we would like to go BMAG at one rate 2 so we can get some attitude hold, over.

END OF TAPE

SNOOPY John, we're going to hot fire again. You ready?

CHARLIE BROWN Go ahead.

SNOOPY Okay, Houston, you probably read the DSKY (garble) but I made these short pulses; I didn't want to waste any fuel here. I'll just stay along with the condition we have in the tunnel, so, they fired and they fired real crisp so I think we're in good shape.

CAPCOM Roger, we copy, Snoop. Stand by for our go.

SNOOPY Okay, Charlie Brown, Snoop. Verify that RCS thruster B3 off and your radar transponder off.

CHARLIE BROWN Roger, the radar transponder's on either and B3's off.

SNOOPY Roger.

CAPCOM And, Snoop, Charlie Brown, you're go for undocking. We had one indication that the, on your hot fire that jet B3 down, we had a TCP stuck on, but if you don't hear anything we're go.

SNOOPY Sounds good here.

CAPCOM Okay.

SNOOPY We're proceeding with the rendezvous radar self test.

CAPCOM Snoopy, Houston. Got some word for you on your torquing angles, your platform, over. If you can listen.

SNOOPY Go ahead, we're listening.

CAPCOM Roger, Geno. It looks like we've got a constant bias in the, in yaw in your platform. On our two drift checks we get a bias of, a torquing angle of minus 03.540 and it appears to be a constant bias because it's been the same between the two different drift checks. We're go with that constant bias. We'd like Charlie Brown to look through the, his rendezvous window and see if we have a constant slippage, maybe, in the, in our docking attitude and you can tell that by looking at the docking target, over.

CHARLIE BROWN Rog.

CHARLIE BROWN And, Charlie, give me a hack when we get close to LOS so that I can get out the high gain, will you?

CAPCOM Okay, we got 8 minutes.

CHARLIE BROWN Okay, I'll stay with you if you pick me up at about 2 or 3 minutes. I'll go off.

CHARLIE BROWN Yes, it is rolled off. Vehicle is yawed to the, rolled to my left about, I'd say 2 degrees or so.

CAPCOM Okay, fine, we get a 3 degree bias

so that's it. Be advised that your drifting off in yaw, Charlie Brown. You might want to watch your attitude.

CHARLIE BROWN Rog.

CHARLIE BROWN Snoopy, Charlie Brown.

SNOOPY Go ahead, John.

CHARLIE BROWN Roger, the EVA preparation is complete.

SNOOPY Okay, good show.

CAPCOM Charlie Brown, Houston. We're concerned about this yaw bias in the LM and apparent slippage of the docking range. We'd like you to disable and keep disabled all roll jets until after undocking, over. And undocking attitude, we will not maneuver to the undocking attitude. Just hold what we've got, over.

CHARLIE BROWN Roger, okay, fine.

CAPCOM And Snoop, we got 3 minutes, 50 seconds to LOS, over.

SNOOPY Roger, 3:50 to LOS.

CAPCOM And we'll see both Snoop and Charlie Brown at 98:25.

SNOOPY Roger.

CAPCOM Okay, Charlie Brown and Snoop, 3 minutes going over the hill. You're go for undocking, and we'll see you around the other side.

SNOOPY Roger.

CHARLIE BROWN Roger.

END OF TAPE

CC Snoop - correction. Charlie Brown, Houston, try it on docking if it is apparent that the LM interface has slipped around to about 6 degrees; do not undock, and lets come around again and look at it. Over.

CHARLIE BROWN Roger.

FLIGHT DIRECTOR Charlie, let them know its 3 and a half now.

CC Roger; your yaw bias right now - the slippage is 3 and a half degrees right now, so about double what you've got, and if it goes that far, do not undock; over.

CHARLIE BROWN Roger.

CHARLIE BROWN That's rog - stop maneuver. Roger.

PAO This is Apollo Control at 97 hours, 39 minutes. We have loss signal as Apollo 10 goes behind the moon. Due to reacquire Apollo 10 at 98 hours, 25 minutes, 42 seconds. During the early part of this 11th revolution, just after AOS, the crewmen were attempting hatch integrity tests on both Charlie Brown and Snoopy - found they were unable to vent the tunnel due to a problem in a vent valve in the top of Charlie Brown. We passed up procedure which in affect, was to reduce the pressure in Snoopy to 3 and a half pounds per square inch. Through the forward hatch, through Snoopy's forward hatch. Bleeding off the pressure through that hatch. This in turn pulled the pressure down in the tunnel giving a Delta P or differential in pressure between the two of one and a half pounds per square inch; in this way we were able to check and verify the hatch integrity for Charlie Brown. Tom Stafford and Gene Cernan then repressurized Snoopy and verified the hatch integrity for that spacecraft. The K factor, about which you heard considerable conversation is timing information for the abort guidance system, the secondary guidance system in the lunar module. We passed up an undocking time of 98 hours, 22 minutes that's just a couple of minutes prior to acquisition of signal on the next revolution, the 12th revolution. We passed up a separation time of 98 hours, 47 minutes, 16 seconds. The separation maneuver will be performed by Charlie Brown at 2 and a half feet per second, radially down, with the RCS thrusters, puts the vehicle in the mini football, starting the separation for the rendezvous. You heard Gene Cernan calling out the check list for Tom Stafford during the reaction control system checkout, both cold and hot firings and pressurization of that system. And Tom's report that the thrusters are nice and crisp and he thinks they are in good shape. We've given Charlie Brown and Snoopy a GO for undocking. Along toward the end of this pass, you may have heard John Young report that EVA preparations were completed; there's no extra vehicular activity planned of course on this mission but these preparations are done for contingency EVA's. Which would be the only method Tom Stafford and Gene Cernan would have to get back to the command module in case it was impossible to dock the 2 vehicles. And just before we lost signal, we informed the crew that there was a bias of about

PAO 3 and a half degrees in the docking interface. We asked them to keep a look at it, and if this interface slipped to 6 degrees, to not undock, to stay docked until they came back in acquisition. This is Mission Control, Houston, at 97 hours, 44 minutes; we will pass on the information about the start of change of shift news conference as soon as it is available.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 97:59, CDT 1348 349/1

PAO This is Apollo Control at 97 hours 59 minutes. We're 26 minutes away from acquisition of Apollo 10 at which time we will begin the very busy rendezvous sequence, starting with undocking and separation. Because of the busy schedule to come and because the flight director on the preceeding shift would like to stay in the control center for some time during the early portion of the rendezvous procedure, the decision has been made to cancel the change of shift new conference that had been scheduled for approximately 1:00 or 1:30. There will not be a change of shift news conference at this time. This is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control at 98 hours 24 minutes, we're about 1 minute away from acquisition of Apollo 10 on its 12th revolution of the moon. We'll find out at acquisition how this undocking went. We'll stand by here live to pick up the first communication.

PAO Madrid has acquisition now. We'll wait for a good lock up to see whether he comes into acquisition with the television camera on or not.

SNOOPY Hey, we got him right away, Tom.

CAPCOM Hello, Snoop, how you doing?

SNOOPY This is Snoop on high gain. How are you reading us?

CAPCOM 5 by, how me?

SNOOPY Reading you loud and clear. We're about 30 or 40 feet away from him, been station keeping for about 5 or 10 minutes here.

CAPCOM Roger, could you give us POO in data? We've got a load for you, and are you ready to copy some pads?

SNOOPY I sure am, I'm going to give you POO in data. And I'm ready to copy.

CAPCOM Roger, as you know it's DOI's first pad, and we've got 3 pads for you starting with DOI. I'll read through all and then you can read me back, okay? Okay, it's DOI 099460089 minus 00699 plus all balls minus 00138 DELTA-VR 00713 027 3 balls 275 minus 00698 plus all balls minus 00144 COAS star is Scorpi Delta minus 023 minus 146 CSI time 103:45:34. TPI time 105:21:01, with an N equal to 1. Phasing pad is next if you're ready to copy. Over.

SNOOPY Roger, I'm ready to copy. Go ahead with phasing.

CAPCOM Roger. 100582520 plus 0 -

SNOOPY Charlie?

CAPCOM Go ahead.

SNOOPY Okay, John said he's not reading you. While I'm copying this he said he's got a picture of the LM if you want to look at it on TV.

CAPCOM We have it, Geno, we're ready to continue with the noun 81 if you're ready.

SNOOPY I'm ready to copy, go ahead.

CAPCOM Plus 02666 plus all balls minus 00594 01769 040 3 balls 255. Noun 86 is plus 01675 plus all balls minus 00568. COAS star is Libra alpha, that's Libra alpha, plus 004 minus 119. Your 100 degree E time

SNOOPY AOT breaker in, Tom?

CAPCOM Your 100 degree E time is 33:31. Your phasing DELTA is minus 5 seconds, 05 seconds. Site 2 time is 10:30. Over.

SNOOPY Okay, I got everything except DELTA-VX on Noun 81.

CAPCOM Roger, DELTA-VX on Noun 81 is plus 01666, and I've got a PDI abort pad if you'll just stand by, over.

SNOOPY I'm waiting for you.

CAPCOM Roger, let me try to raise Charlie Brown. Charlie Brown, Houston, over.

CAPCOM Charlie Brown, Houston, over.

SNOOPY Houston, this is Snoopy reading you loud and clear.

CAPCOM Roger, he's copying the pad then, we're not reading him at all, Snoop, and I'm ready with a PDI abort pad if you're ready to copy. Over.

SNOOPY Okay, PDI abort. go ahead.

CAPCOM 100434550 plus 00931 plus all balls plus 3 balls 1.1 00931, Burn time is 022, 3 balls, 283 plus 00931 plus 00000 plus 3 balls 22. NA on the rest of the pad. Thrust profile is 15 seconds at 10 percent and in manually throttled to full thrust until completion. CSI time 101:44:25. TPI time 103:22:25 with an N equal to 1, and I'm standing by for your readback. And Snoopy, you've got the computer back. We're through with the load.

SNOOPY Okay, Charlie, hit it. Roger, thank you, hear the commence: DOI is 099460089 minus 00699 plus all balls minus 00138

END OF TAPE

SNOOPY Rog, thank you. Here they come at you. DOI is 099:46:00:89 minus 00699 plus all balls minus 00138 00713027 three balls 275. Noun 86 is minus 00698 plus all balls minus 00144. Verb 5 Delta minus 023 and minus 146.

CAPCOM Go.

SNOOPY Phasing is 100582520. Are you with me?

CAPCOM Go.

SNOOPY Okay, I'll back up and give you CSI time and TPI time for DOI. CSI is 103:45:34; TPI is 105:21:01 with an unequal 1. Phasing, phasing is 100:58:2520 plus 01666 plus all balls minus 00594 01769 040 000255 plus 01675 plus all balls minus 00568. Libra Alpha is the star. It's plus 004 and minus 119. And 100 degrees east is 33 plus 31. Phasing Delta is minus 5 seconds. Site 2 is 10 plus 30. Are you with me?

CAPCOM Go.

SNOOPY Okay, PDI abort is 100:43:4550 plus 00931 plus all balls plus 00011 00931 022 000283 plus 00931 plus all balls plus 00022. The star is NA, 15 seconds at 10 percent then manual to full thrust. PSI is 101:44:25, TPI is 103:22:25 with an unequal 1.

CAPCOM Good readback, Snoop. Over.

SNOOPY Houston, this is Snoop. Charlie ;rown's trying to call you.

CAPCOM Roger, Snoop. We don't read him. Charlie Brown, verify your S-Band switch is in TR, over.

SNOOPY John, is your S-Band switch in TR, and I'll give you anything you need? Just ask, go ahead.

SNOOPY Okay, the time of DOI, Charlie Brown, is 099:46:0089 minus 00699 plus all zeros and minus 00138. That's noun 81 for DOI. Okay, phasing is 100:58:2520. Noun 81 is plus 01666 plus all balls and minus 00594. And verify your TR switch is in S-Band TR, John.

CAPCOM Snoopy, Houston.

SNOOPY Okay.

CAPCOM Snoopy, Houston. I'm breaking in. It's a ground problem with the CSM. We're losing - we got the downlink to Goldstone so we're not getting it here in the MCC.

SNOOPY Okay. I'll tell you, this comm has got to be fixed within the next couple of hours, Charlie, so tell them to get with it.

CAPCOM Roger.

SNOOPY Everything else is going good here.

SNOOPY Houston, this is Snoopy. Is that

69.2 by 57.5 good?
CAPCOM Stand by. Snoop, Houston. We're not with you on the 69.2, say again.
SNOOPY I'm reading verb 82 out of the DSKY 69.9 - 62.9 by 57.5.
CAPCOM Stand by, we'll have it for you. Snoop, Houston. FIDO's checking, stand by. Snoop, Houston. That's a go on the apogee and perigee.
SNOOPY (garble - simultaneous with CAPCOM).
CHARLIE BROWN Okay.
PAO We're about 7 minutes away from the separation burn.
SNOOPY Looks like we're pretty steady out here on the stationkeeping, John, once we got squared away on our attitude.
SNOOPY Okay.
CAPCOM Snoop, Houston, we got a beautiful picture out there -
SNOOPY Give me a mark at 6.
CHARLIE BROWN Roger, I will, a mark at 6 minutes.
CAPCOM Charlie Brown, we finally got you, over.
SNOOPY Okay, we're counting down.
CHARLIE BROWN That wasn't 6 minutes.
SNOOPY What was it, Jose?
CHARLIE BROWN Okay, I've got 5 seconds to 6 minutes.
SNOOPY Okay.
CHARLIE BROWN Okay, 6 minutes and counting down to SEP.
SNOOPY Got you, Babe.
CAPCOM Charlie Brown, Houston. We're reading you 5 by now, over.
CHARLIE BROWN Roger, I've got 5 minutes and 45 seconds to SEP, 44, 43, 42.
CAPCOM We're right with you.
SNOOPY Houston, this is Snoopy. With that drift you saw how do you expect our platform to be, how close to good alinement?
CAPCOM Rog, we expect very small torquing angles in all axes, over.
SNOOPY That's good to hear, thank you. Well, I hope we can get back on the nominal after that insulation kind of goofed us up, Charlie. But everything's looking good here.
CAPCOM Roger, Tom. Could you - one question on the tracking light. Have you tried it?
SNOOPY Stand by. John, there's the tracking light for you.

CHARLIE BROWN Yea, please turn it off.
SNOOPY It works.
CAPCOM Great, thank you. We saw it.
SNOOPY John, why don't you toss on your tracking light for a minute.
CHARLIE BROWN Roger, that's mine. It may be underneath the vehicle, I don't think you can see it.
SNOOPY Yea. I saw one reflection here. We're okay.

END OF TAPE

SNOOPY Okay, Charlie, it looks like about 230 coming up set, babe.

CHARLIE BROWN Rog, I agree.

SNOOPY Houston, you can tell FIDO and Support Division that these Hasselblad film packs have failed about three or four times on us.

CAPCOM Roger, Snoop, we copy.

SNOOPY We're still getting some pictures though. It made the camera (garble) in the magazine.

CAPCOM Roger.

PAO This separation maneuver will -

CHARLIE BROWN Okay, Houston, coming up on 2 minutes to sep. How about a sync mark?

CAPCOM Roger, we copied 1 minute.

CHARLIE BROWN Rog. You're right.

CAPCOM Big Brother is watching.

CHARLIE BROWN Keep up the good work, boys. You will never know how big this thing gets when there ain't nobody in here but one guy.

SNOOPY You will never know how small it looks when you are as far as we are.

CHARLIE BROWN Okay, separation.

SNOOPY Okay, configure thrust for us in there, John, and we're moving away.

CHARLIE BROWN Okay. You are 5.3 on the DSKY and 5.0 on the EMS and 0 on the MS.

SNOOPY I'd be inclined to believe the MS today.

CAPCOM We copy, Charlie Brown.

SNOOPY Okay, Hose, say adios and we will see you back in about 6 hours.

CHARLIE BROWN Roger.

CAPCOM Snoop and Charlie Brown, we see you separating on the big tube.

SNOOPY See you, John.

CHARLIE BROWN Rog.

SNOOPY Have a good time while we're gone, babe.

SNOOPY Rog, don't get lonesome out there, John.

SNOOPY And don't accept any TEI updates.

CHARLIE BROWN Don't you worry. Until you get back, I ain't copying any more pads.

CHARLIE BROWN Houston, this is Charlie Brown, over.

CAPCOM Go ahead, Charlie Brown.

CHARLIE BROWN Roger. While we were waiting to come over the hill, we checked out VHF and we're right now on VHF AMA and receive only B data.

CAPCOM Beautiful, sounds good. Thanks a lot.

CHARLIE BORWN And don't ask me to tell you what the dickens the trouble was.

SNOOPY Houston, one other interesting little fact. I could never get my AGS local vertical angle and VERB 83 to agree until after we undocked.

CHARLIE BROWN Okay there, Snoopy babe, let's check out this duplex ranging, okay?

SNOOPY Okay, I'll go to duplex ranging on your mark, and we will be quiet and wait for your call.

CHARLIE BROWN Roger. Go into duplex ranging, on my mark. Mark.

CHARLIE BROWN You guys shut up, because I can hear you. You have to maintain silence about the ship on that vox mode. I'm going to arrange a reset right now.

CHARLIE BROWN How about that. 800, 700, 420 feet, 540 feet -

SNOOPY Okay, babe, - Roger, I hear you.

SNOOPY I don't hear any background noise, just you.

SNOOPY Hey, John, if you get a chance, you can turn on the radar transponder and we will correlate the VHF ranging with it.

CHARLIE BROWN Okay, my transponder is on. Transponder is on, its CAP switch is in operate.

SNOOPY I should be getting a radar signal here and I sure don't.

SNOOPY Hello, Houston. How soon will you ave our new uplink on the CSM state vector, out?

CAPCOM Stand by, we will have it in a moment.

CAPCOM Snoopy, Houston. We are ready with the load, POO in data, over.

SNOOPY POO in data, you've got it.

SNOOPY John, are you getting signal strength on your transponder there. I've got you locked. Of course I don't get any radar new signal strength.

CHARLIE BROWN Okay. Am I below you or above you?

SNOOPY You're right at me. Okay. Pitch up maybe a little bit.

CHARLIE BROWN Roger.

SNOOPY Pitch up a little more now.

CHARLIE BROWN Say when.

SNOOPY Okay. I am looking foresighted on your transponder. I don't get any ATC strength.

CHARLIE BROWN Okay Tom. I checked it out this morning and AGC was good.

END OF TAPE

SNOOPY Okay, I'm looking right at - I'm bore sited on your transponder. I don't get any AGC strength.

CHARLIE BROWN Okay, Tom, I checked it out this morning and AGC was good.

CHARLIE BROWN I got 3.6 volts on disc 6 systems test 1A - disc test D I got 2.1 volts on test, and on C I got 4/10ths volt, and I guess that was unlocked.

SNOOPY Houston, do you have us on telemetry; I can't get any AGC signal here, really about a thousand feet away.

CC Roger, Snoopy; we've been copying your problems; we are working it down here, and we've got your load in; the computer is yours again. Stand by on the radar.

SNOOPY Houston, we had a real good radar self test; everything worked on getting transmitting power to 3.2, we get the shaft error, the trunnion error, the AGC, I've got the needle boresited and centered, but we get no AGC.

CC Roger; we copy. Your pings needles are moving?

SNOOPY Yep. I can slew up and down, high rate and low rate; everything; I've got him boresited there.

CC Roger; stand by.

CHARLIE BROWN Houston, I'll run through the self test again if you think that'll help any from this end.

SNOOPY Go down and look at it again - you might give it another try John.

CHARLIE BROWN Okay.

SNOOPY So this was a NO/GO for DOI. I've got you boresited right there, the needles are centered at nothing. My AC rendezvous radar ... breaker is in, and my ... radar is in.

CC Break, break Snoop - this is - correction, Charlie Brown, this is Houston. We need you in a transponder position on the systems test before you get the proper readout; over. For the self test of the rendezvous -

CHARLIE BROWN I'm in that transponder position.

CC Okay.

CHARLIE BROWN Okay, I'm reading - S8 is reading zero right now.

CC Roger - we -

CHARLIE BROWN And B is reading zero. And its also reading zero but it was working a few minutes ago. On the original self test.

CC Roger; stand by.

CHARLIE BROWN Yeah, this thing is reading zero. Let me check the circuit breaker.

CC Roger.

CHARLIE BROWN Okay, the rendezvous transponder flight BUS circuit breaker is in.

CC Roger; how about trying to recycle the power switch Charlie Brown?

CHARLIE BROWN Hey that did it you guys; it's ON.
SNOOPY Ohh, and I got signal strength ole buddy.
CHARLIE BROWN What do you know about that.
SNOOPY I've got 3.2 AGC -
CHARLIE BROWN You got so much AGC, I don't know what to do with it.
SNOOPY John, I could kiss you.
CHARLIE BROWN It was Charlie's idea to cycle the switch; that would have never occured to me.
CC It was Ed's idea -
SNOOPY O'k you both sound pretty good -
CC Charlie Brown, Houston, we're ready to go with your load if you'll give us POO and ACCEPT Charlie Brown.
CHARLIE BROWN You have it.
CHARLIE BROWN What you guys got for range?
SNOOPY Roger. We've got 2500 feet. We've going to get you some raw data here, John, and my optical boresite is absolutely fantastic. It's right with the needle.
CHARLIE BROWN It's got .37 miles. This is going to be very interesting, it keeps jumping.
CHARLIE BROWN Point 4 miles.
SNOOPY Okay. That looks real good on my tape here.
CHARLIE BROWN Houston, Charlie Brown, the reason I believed the MS over the VMC was I had three-tenths of a foot per second of ... bias before I ever started the maneuver. Over.
CC Roger. We copy. Over.
SNOOPY Okay, John, we're out here in earth shine, how about turning on your flashing light, okay? Beautiful, you've got a nice one. It looks like the old Gemini Agena, which is bigger.
CHARLIE BROWN Roger.
CHARLIE BROWN Roger. You are supposed to start on P52. I saw your tracking light there briefly, but I haven't seen it since.
CC Charlie Brown, Houston, C&C is yours.
CHARLIE BROWN Roger. Thank you.
SNOOPY John, you see the tracking light now, it's on?
CHARLIE BROWN Could you guys see it flashing.
SNOOPY No. No.
CHARLIE BROWN I see it.

SNOOPY Okay.
SNOOPY Okay, John, I'm ready when you are to go to VHFA simplex and data.
CHARLIE BROWN Okay. On your mark. Simplex and data. Okay, simplex data.
CHARLIE BROWN Snoopy, Charlie Brown, how do you read?
SNOOPY Read you loud and clear, John.
SNOOPY All right, John.
CHARLIE BROWN And you are saying?
SNOOPY All right. We're going to terminate our data check to go on P-52.

END OF TAPE

SNOOPY Charlie Brown, Snoop, you can go ahead and kill the tube any time you want to and put the cover over it.

CHARLIE BROWN Say again, over.

SNOOPY Roger, you can go ahead and kill the TV and put the cover over the tube.

CHARLIE BROWN I've done all of that already.

SNOOPY Roger.

CHARLIE BROWN Tom, hold your tracking light down. Are you able to do a P52 with that light on?

SNOOPY I think so, John. I'm going to try it.

CHARLIE BROWN That's beautiful. Can you see mine?

SNOOPY Oh, yes, John, you're absolutely sensational. Good maneuver. Yeah, it's flashing about every second. It's just beautiful. Okay, we're going to auto maneuver (garbled).

SNOOPY I got you in the sextant, John. In my telescope. Right now, you're passing through it.

CHARLIE BROWN Roger.

SNOOPY Boy, I'll tell you. That's black out there, isn't it?

CHARLIE BROWN No other color to describe that.

CAPCOM Snoop, Houston. We've reached the limits on the high gain. Go to omnis. Over.

CAPCOM Charlie Brown, Houston. Pass to Snoop that he has reached the tracking limits on the high gain and please go to omnis. Over.

CHARLIE BROWN Okay. Hey - hey, Geno, go to omnis. Your high gain has reached its limits.

CAPCOM Charlie Brown, Houston. Pass to Snoop, that we -

CHARLIE BROWN I tell you I got a beautiful sight.

CAPCOM Charlie Brown, Houston. Pass to Snoop that we'd like -

CHARLIE BROWN Go ahead there - uh -

CAPCOM Okay, I'm talking. Pass the - pass the - on to Snoop that we'd like the AFT antenna. Over.

CHARLIE BROWN Roger. They want the AFT antenna there, Snoop babe.

CHARLIE BROWN Yeah, I can see it myself. Hey, did you hear they want the AFT antenna?

SNOOPY Rog.

PAO This is Apollo Control at 99 hours, 14 minutes. We still have 23 minutes left in this pad before we lose signal. Just prior to the loss of signal, Snoopy will be given a GO/NO-GO for the descent orbit insertion which will take place behind the moon.

END OF TAPE

PAO -which will take place behind the moon.

PAO Both vehicles are now in small equal period orbits. The separation maneuver was performed by the Command and Service Module, Charlie Brown. It sent Charlie Brown down in ahead of Snoopy. However, on the relative motion plot, and from Charlie Brown's point of view, Snoopy was going above and behind him. Maximum distance in this orbit would be about differential heights would be close to 5 miles and not quite 2 nautical miles distance separating them.

CC Hello Charlie Brown, Houston. A couple reminders. We'd like delta V CG to go to CSM and the B mags to either rate 1 or Rate 2, your choice.

CHARLIE BROWN Thank you kindly.

CC Roger. Roger. Out.

PAO The descent orbit insertion will be performed one half a revolution after the separation maneuver. Time for the descent orbit insertion 99 hour, 46 minutes.

CHARLIE BROWN Houston. This is Charlie Brown. What times LOS over?

CC Roger. Charlie Brown. Coming up LOS to you 16 minutes and 30 seconds mark and we'll see you AOS at 124.

CC Charlie Brown?

CHARLIE BROWN Could you give me the LOS in GET?

CC Roger. LOS GET is 99 37 32 over.

CHARLIE BROWN Roger. Thank you.

CC And Charlie Brown, Houston. We noticed the read out temp a little high and if you get a little stuffy in there we recommend you activate the secondary evaporator and the secondary pump. And then when you cool down, you can just turn off the evap and leave the pump running. Your choice. Over.

CHARLIE BROWN The cabin temperature is 74 and the suit temperature is 51. Can't beat that.

CC Sounds like up town, over.

CHARLIE BROWN It's some place. Let me tell you.

CC And Charlie Brown if you have some good word from Snoop - we still don't have any data and if they pass on to you about the P52 we'd be interested. Over.

CHARLIE BROWN ROGER.

CHARLIE BROWN Hey Snoopy. How's your P52 going?

PAO P52 is the platform realinement in the Lunar Module. Gene Cernan is doing that while Tom Stafford is running systems checks on other systems.

CC Charlie Brown, Houston. You can go back to block on your up telemetry switch.

CHARLIE BROWN Okay. I wouldn't want anybody to zip me in any bad data on the back side.

CC Rog.

CC Did you talk to snoop there, Charlie Brown? Over.

CHARLIE BROWN Yeah. Hey Snoopy, this is Charlie Brown over.

CHARLIE BROWN Is Geno keying his mike all the time? Sometimes I hear him and sometimes I don't. Maybe that feed through valve isn't as bad as they thought.

END OF TAPE

CHARLIE BROWN Houston, Snoop's calling you.
CAPCOM Charlie Brown, Houston. We don't read Snoop. We haven't locked up on his data yet. Over.
CHARLIE BROWN Roger. Did you hear that, Houston?
CAPCOM That's negative, Charlie Brown. Over.
CHARLIE BROWN - margin and descent fuel - You been monitoring his descent stage fuel pressure, and gage windows here are doing a P52 burn.
CAPCOM Roger, Charlie Brown. We have no data at all. Over.
CHARLIE BROWN Okay, Snoopy, this is Charlie Brown. Houston doesn't have any data from you today - right now.
CAPCOM Charlie Brown, Houston. Tell Snoop to do a burn 64 to get us to high gain, and we got another transducer that we can verify that pressure. Over.
CHARLIE BROWN Houston, this is Charlie Brown right now (garbled). (Garbled).
SNOOPY Charlie?
CHARLIE BROWN Yes sir.
CAPCOM Snoopy?
SNOOPY Yes sir. Charlie -
CAPCOM Snoopy, Houston.
CHARLIE BROWN Snoopy is calling, and he says that you have a high gain.
CAPCOM Roger. We got the -
CHARLIE BROWN Right now with it.
CAPCOM Roger, we got the data, Snoopy.
CHARLIE BROWN Houston -
CAPCOM We got the data, Snoopy, and the descent pressure looks fine. Over.
SNOOPY Okay, I see (garbled) descent 1 and descent 2 both out.
CAPCOM Roger, understand. Descent pressure -
CHARLIE BROWN Did you say 1 and 2 both out?
CAPCOM Copy.
SNOOPY Okay, and you are giving me a go on descent pressure. Is that correct?
CAPCOM That's correct.
CHARLIE BROWN They said both descent pressures look good there, Snoop.
SNOOPY Okay, I can read them, John. That's what I wanted to hear from them.
CAPCOM Snoop, Houston. Could you -
SNOOPY I don't - I don't know exactly what kind of -
CAPCOM Snoop, Houston. Could you give us your P52 results? Over.
SNOOPY Roger. Stand by.
SNOOPY Okay, the stars were 33 and 25.

SNOOPY Star angle difference was 4 balls 9.. Gyro torquing angles are minus 668 minus 195 minus 055. Over.

CAPCOM Roger. We copy, Snoopy. Out.

SNOOPY Roger. And initial acquisition of the star (inaudible) realign look pretty good.

SNOOPY Houston, this is Snoopy. When's AOS or LOS rather occur?

CAPCOM Roger. We're coming up on LOS for you at 99:37, correction 99:38. We'll see you AOS at 100:26. Over.

CHARLIE BROWN Hey, Tom. What was your biggest gyro torquing angle? Over.

SNOOPY I got em, Charlie.

SNOOPY Roger. Biggest gyro torquing angle was register 1 minus 668.

CHARLIE BROWN Is that .66?

SNOOPY It was 2 balls 668. 2 balls 195, and 3 balls 55. All minus.

CHARLIE BROWN Rog.

CAPCOM Snoopy, Houston. We got some word on your Haselblad problem on the magazine problem, we'd like you to reset the magazine flag so that the red just disappears and no further. If this doesn't work consistently, then change magazines. Over.

SNOOPY That is why we already know that technique we changed magazines. Over.

CAPCOM Roger, we copy. Out.

CAPCOM Hello, Snoop, and Charlie Brown, this is Houston.

SNOOPY Houston, are you satisfied with the -

CAPCOM You're - Snoop in Houston you are GO for a DOI. Recommend you check on CB 16 display engine override breaker. It might recover your descent monitoring capability. Over.

SNOOPY Roger.

SNOOPY No, there's no breakers out there to hurt that, Charlie. I'm going, as long as you're satisfied, I'm going omni this time.

CAPCOM Roger, we copy. You've got 4 minutes.

SNOOPY Okay, I did - when I went down P52 and when I slamed the S-BAND into the stops, I did pop my S-BAND antenna breaker under com on channel 16.

CAPCOM Roger, copy.

END OF TAPE

CAPCOM Snoop, Houston. We show 2 minutes to LOS for you. Do you have anything? Over.

CHARLIE BROWN Snoopy's just been wondering if you're reading him. I guess you are.

CAPCOM Charlie Brown, Houston. No sweat.

CHARLIE BROWN Snoopy, Charlie Brown. Do you read. Over.

SNOOPY Fine.

CHARLIE BROWN We need to keep at least one set of communications open at all times, somehow.

CAPCOM Charlie Brown, Houston. 45 seconds to LOS. You're still go for DOI.

CHARLIE BROWN Roger. What is my P20 doing? Can anybody tell me?

CAPCOM Stand by.

CHARLIE BROWN Well, it can't seem to make up its mind.

SNOOPY Garbled.

CAPCOM Charlie Brown, Houston. It's integrating a state vector, P20.

CHARLIE BROWN The one we just finished?

CAPCOM Right.

SNOOPY John, read through it. I don't know, I thought I got it. You'd better go through it again, over. I'm not on vox. (Garbled)

PAO This is Apollo Control at 99 hours, 38 minutes, and we have loss of signal on both vehicles. Charlie Brown going aroung the corner 25 seconds before Snoopy. This separation maneuver has put the Command Module, Charlie Brown, ahead of Snoopy. Acquisition times for Charlie Brown 100 hours 24 minutes. For Snoopy 100 hours, 26 minutes. To recap the situation during this 12th revolution while we were in contact with Charlie Brown and Snoopy, as we acquired the vehicle had undocked and were 30 to 40 feet away in station keeping. We passed up a number of maneuver pads, times, and delta V's for the maneuvers that will take place in the rendezvous sequence and I'll recap those times at a short time. Tom Stafford reported some trouble with the hasenbald film pack. Apparently film jamming. We did pass up later in the pass a procedure to try to correct this situation. Advised him that if it did not correct it to change magazines. The separation maneuver was performed on time and the controllers here on the ground said that it was at the proper delta V, 2.5. We copied the orbital parameters just prior to separation as 62.5 by 57.5 nautical miles. The Lunar Module, Snoopy, would have stayed in that essentially that same orbit. The separation maneuver for

PAO Charlie Brown was targeted for an orbit of 62.1 by 57.9 nautical miles, essentially the same orbit because 2 and 1/2 feet per second would not change that very much. We had a television pass during the separation and as the vehicles separated you heard Gene Cernan caution John Young not to accept any TEI updates while they were gone. TEI, of course, is Trans Earth Injection and Tom Stafford and Gene Cernan want to find John Young there when they get back and complete this rendezvous. We then appear to have a rendezvous radar problem which eventually was traced to the transponder in the Command Module. Some concern at the time that we would not be able to perform DOI and we would not have been able to give Snoopy a go for DOI if the transponder had not become operable. We need the rendezvous radar for the rendezvous sequence. John Young recycled a power switch and got power back into the transponder and the system is working fine. Snoopy cannot monitor the propellant tank pressures for the descent propulsion system on board. However, we can look at them from the ground. We checked them prior to giving Snoopy a go for DOI and those pressures are very good and we're not concerned about them. So Snoopy will be performing the descent orbit insertion burn at 99 hours, 46 minutes at delta V of 71.3 feet per second. The duration of the burn 59 seconds. This will be performed by the descent propulsion system at 10% throttle for the first 15 seconds and then throttling to 40% for the remainder of the burn. The orbit targeted as a result of the DOI for Snoopy 61.2 by 8.4 nautical miles and as a result of this maneuver Snoopy will start coming down to swoop over the lunar landscape at this low point. Pericynthion, the 8.4 miles coming 15 degrees prior to reaching landing site 2. Times on the remainder of maneuvers in the rendezvous sequence phasing 100 -

END OF TAPE

PAO --rendezvous sequence phasing 100 hours, 58 minutes 25 seconds. Again, a descent propulsion system burned, duration 1 minute, 12 seconds, DELTA V 176.8 feet per second. We are targeting for an orbit for Snoopy at 189.8 by 11.7 nautical miles. The time for staging at which time Snoopy will jettison the descent stage, 102 hours 45 minutes. Ten minutes later at 102 hours, 55 minutes, and 1 second, the insertion maneuver will be performed. Duration of that maneuver is 10 seconds, DELTA V 220.9 feet per second. This will be performed with the ascent propulsion system. We targeting for an orbit 45.9 by 10.7 nautical miles. The concentric sequence initiation maneuver, CSI, at 103 hours, 45 minutes, 33 seconds. Duration of the burn 51 seconds, DELTA V 44.9 feet per second. This will be performed with the lunar module reaction control system. Targeting for 47.7 by 41.9 nautical miles. The constant DELTA heights, CDH maneuver, at 104 hours, 43 minutes, 31 seconds. Duration 58 seconds, DELTA V of 2 feet per second. Again, with the RCS system of the lunar module, targeting for 47.8 by 42.1 nautical miles. Terminal phase iniation TPI at 105 hours, 21 minutes, 1 second, duration 38 seconds with the lunar module reaction control system DELTA V 24.7 feet per second. Resulting orbit 58.7 by 47.5 nautical miles. The terminal phase breaking to begin at 106 hours, 3 minutes, 57 seconds. Again an RCS maneuver in which the lunar module will null its velocity and start station keeping with Charlie Brown. This is Mission Control, Houston, at 99 hours, 48 minutes.

END OF TAPE

PAO This is Apollo Control at 99 hours, 55 minutes. We have a correction on the duration of the maneuvers that I just read to you. The durations that I gave you are not correct. I was reading from the wrong list. Here are the proper burn durations for those maneuvers. Descent orbit insertion 27 seconds, phasing 40 seconds, insertion 15 seconds, CSI 28 seconds, CDH 2 seconds, and TPI 15 seconds. The - starting with the CSI maneuver, Snoopy will use onboard calculations to figure these maneuvers and compare them with the ground provided pad, but it's preferable that they burn the onboard solutions. This is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 100 hours, 23 minutes. We are just 1 minute away from acquisition of Charlie Brown, 2 minutes, 23 seconds away from acquiring Snoopy.

CHARLIE BROWN Houston, Charlie Brown. Over.

CC Roger. Reading you 5 by, Charlie Brown.

CHARLIE BROWN Houston, Charlie Brown. Over.

CC Roger, Reading you 5 by, Charlie Brown. Over.

CHARLIE BROWN Houston, Charlie Brown.

CC Houston, Charlie Brown. I am reading you 5 by.

CHARLIE BROWN Houston, Houston, Charlie Brown. Over.

CHARLIE BROWN Houston, Houston, Charlie Brown. How do you read our high gain? Over.

CHARLIE BROWN I'm all locked up on them, Tom, but I just don't read them.

CC Charlie Brown, Houston. Over.

CHARLIE BROWN Roger. Read you loud and clear. Snoopy was go for DPI.

CC Roger. Sounds great. We copy.

CHARLIE BROWN --nominal burn. He'll fill you in when he gets to you, but in 6 miles he was still in 65 feet per second on my, 6 miles from me he was doing 65 feet per second. In 3.8 miles he was doing 73 feet per second. I think that confirms this burn. They are down there among the rocks rambling about the boulders ... right now.

CC Roger, Charlie Brown.

CHARLIE BROWN They just saw earth rise. They say they are looking up at the horizon now.

CC Roger.

SNOOPY Hello, Houston, this is Snoopy.

CC Roger, Snoopy, go ahead.

SNOOPY We is going. We is down among us, Charlie.

CC Roger. I hear you weaving your way up the freeway. Can you give me a postburn report? Over.

SNOOPY Yes. As soon as I get my breath. Okay. Our burn was on time. Our residual was minus .1, minus .3 and minus .5. And that was the residual for the

SNOOPY DPS burn. We did not use the -- we did not null anything out. We are at 61.2 by 9.2 and the AGS has us at an 8.6.

CC Roger, Snoopy. We copy all the residuals and it looks like we are all go. Your DPS is looking good and it's go. Over.

SNOOPY Oh, Charlie, we just saw an earth rise and it's just got to be magnificent.

CC Roger. We copy.

SNOOPY You can also tell Jack Shmitt that there are enough boulders around here to fill up Galveston Bay, too.

CC He's copying, Tom.

CHARLIE BROWN The only trouble is we're stripping lots of film for him, the spacecraft is looking good and there are no problems, Charlie, except it would be nice to be around here more often.

CC Roger, we copy. All your systems are looking good to us. Did you get your DPS pressure back? Over.

CHARLIE BROWN That's a negative, but the DPS burn was smoothed out very well when we throttled up.

CC Roger. We got a good - good pressures here and the DPS is go for phasing.

CC Snoop, Houston, there will be no update on the phasing pad. Everything is looking really good.

SNOOPY Okay. Good. We'll be picking up our landing radar test and taking pictures here and it is a fantastic sight. They do have different shades of browns and grays here. It's like the vulcan ...vulcanism, there is also a pure white near the edge and the bottom is black and we see some large boulders that are black to blackish gray.

CC Roger, Snoopy, we copy.

PAO Snoopy is over the Smyth's Sea area now.

CC Charlie Brown, Houston, can you see them down there among the boulders? Over.

CHARLIE BROWN I saw them about 14 miles, but then I turned this thing over to CMC to let it do an auto maneuver and lost them.

CC Roger.

CHARLIE BROWN I was tracking them just manually. I don't see them anymore. I'm going to update it with a little radar, a little range, and see if that brings it in.

CC Roger, Charlie Brown, we copy. Out.

SNOOPY Houston, this is Snoopy. It looks like this landing radar is doing real good.

CC Roger, Snoopy, we Roger. Over.

SNOOPY It looks to me we ought to have a lock on here even early.

END OF TAPE

SNOOPY And straight up ahead you can see the Gulf from the highlands over to the Maria area. It's a beautiful sight. Just like your crossing over to a black and gray sea.

SNOOPY ... radar looks like it's locked on solid.

CC Rog. Snoop. Over.

SNOOPY Houston. I've got the ascent batteries connected at this time.

CC Roger. We see that. Thank Snoop. Over.

PAO Snoopy.

SNOOPY There's so many things to do in such a short time.

PAO Snoopy coming up on 70 degrees east longitude now.

CC Snoop, Houston. Your ascent batteries look good. Out.

SNOOPY Roger.

SNOOPY Also Joe, it looks like we're getting so close all you have to do is put your tail wheel down and we're there.

CC Yeah Snoop. Air Force guys don't talk that way.

SNOOPY (Garble)

SNOOPY Okay, we're coming right over to the edge of the ... It's really smoothed out here compared to ...

CC Roger. If we have you, you should be at Serenitatis very soon.

SNOOPY Roger.

CHARLIE BROWN Okay Houston. I've got them in the optics now. They're fantastic.

CC Hey great show, Charlie Brown.

SNOOPY We can tell that this area is definitely lower than that highland area just as the whole general area.

CC Okay. Snoop. Can you come up on second surface watch. Can you comment on that. Over.

CHARLIE BROWN Oh. Are they down there among them.

CC Roger. Bet it looks like their really hauling the mail.

CHARLIE BROWN Yup. They're doing it.

SNOOPY Suprisingly enough Charlie, it really doesn't look like we're moving too fast down here. It's a very nice pleasant pace.

CC Rog.

SNOOPY (Garble)

CC Copy. Out.

SNOOPY Seems like we're coming up on my side on Serenitatis Sea and I believe Tom's got his direction ... right there on his side. Just come out of the horizon just a minute. Seemed to come over the horizon to be much closer to me down here. There up there at 60 miles, (garble)

CC Snoop, you're dropping out. Your voice faded out. We're standing by.

PAO Pericynthian time 100 hours, 43 minutes, 20 seconds.

Snoopy Hello, Roger, Snoopy. If you read us Houston, we think your terminals are not tracking us too closely. Can you pick us up on the signal strength? Over.

SNOOPY Houston. (Garble)

CHARLIE BROWN Snoopy, Houston said something about the thing on the signal strength or something.

SNOOPY Tell me again what you want me to do there, Houston.

CC Roger, Snoop. We're getting data dropout and it sounds like..

SNOOPY We're passing Apollo Ridge.

CC Roger. We copy on Apollo Ridge.

SNOOPY (Garble)

PAO Apollo Ridge at 42 degree east longitude.

CC Hello, Snoop, Houston. Do you read? Can you try to tweak up the high gain signal strength weak. Over.

CHARLIE BROWN Loud and clear there, Gino.

CC Charlie Brown, Houston. If you read, have Snoopy tweak up the high gain. We're not reading him at all. Over.

CHARLIE BROWN Roger.

CHARLIE BROWN Snoopy, Houston wants you to tweak up the high gain. They are not reading you.

CHARLIE BROWN Snoopy, Charlie Brown. Over.

CHARLIE BROWN Houston. Snoopy said they can't hold you on the high gain.

CC Roger. Stand by.

CC Snoop, we read you. Standing by.

CHARLIE BROWN They are reading you, Houston, but...

CHARLIE BROWN They are reading you and Snoopy standing by.

SNOOPY Okay, we are leaving Sidewinder, Tom, give me that a minute. I've got Censorius A (garble) here. Hey, I tell you we are low, we are close, Babe. This is it and it really looks pretty smooth down there surprising enough. Censorius A has huge boulders all around the rim of it falling on the inside and outside. Okay, I've got Maskelyne out here on my right side. We are coming up on Boot Hill and it is very easy to distinguish

SNOOPY Maskelyne and I see the craters that are going to lead us right into the landing site. We've got Duke Island on the left just past Boot Hill and we are coming up -- I've got Wash Basin just off my right arm -- very easily distinguishable, Tom, ought to have Sidewinder Rill coming up on the left. Give me that, Gene. Here it comes. What time did we pitch over 11:40? Yeah. Okay, I've got Diamondback, Diamondback Rill is very easy to see. These rills look like they may be as much as a couple of hundred feet deep and very smooth. The surface actually looks very smooth, like a very wet clay, but smooth with the exception of the bigger craters. Let me get a picture of those rills, Diamondback. Sidewinder Rill is rugged on the edges and smooth on the bottom. The edges are definately rounded and it doesn't look like the sides are upturned. Okay, I've got Moltke up here on the left and we are coming into the site. The best description I can give you of these rills is of a dry -- a dry desert out in New Mexico or Arizona. Okay, here we are coming up on the site.

MCC ITCC Controllers and Computer Sups. Let's evaluate the displays. Make sure that you don't have any displays up that you don't require.

SNOOPY Okay, I've got Moltke on the left and Maskelyne A...

END OF TAPE

(garbled)
CAPCOM Dynamics computer suit, can you let your checkout monitor go?
SNOOPY Okay, we just went off ...
(garbled)
CAPCOM Snoop, Houston. Request down voice back up, over.
CHARLIE BROWN Snoopy, Houston wants you to go to down voice back up, over. That's where he is. He's in down voice back up. Okay.
CAPCOM Charlie Brown, Houston. Over.
CHARLIE BROWN Go ahead, over.
CAPCOM Roger, we had a complete data drop out with Snoopy.
SNOOPY I read you loud and clear.
CAPCOM Okay, roger. Pass them on we got 9 minutes till the burn get in the attitude and they're go for phasing, over.
CHARLIE BROWN Roger. Snoopy, Houston says you're go for phasing. Got about 8 and 1/2 minutes now, want to get you in the attitude. Snoop, Charlie Brown. Do you read?
SNOOPY You know this God damned filter has failed on me. My hasselbad just failed. Oh, I tell you man, that's something. Okay. Oh, look at that. If I don't have any more -
CAPCOM Snoop, Houston. We're reading you about 3 by now. We're counting 8 minutes to the burn over.
CHARLIE BROWN I just got a VHF (garbled). Confirm, over.
SNOOPY Roger, we're going to phasing attitude.
CAPCOM Roger, and you're go for the burn.
SNOOPY Yea, you can't imagine the position we can see these things pitched way down like this. It looks like we're not very far above them.
CHARLIE BROWN Okay, babe. You might try and get your helmets and gloves on. I went through P30 and we're all set there again.
SNOOPY What is your attitude, babe. Boy, it's getting dark. Okay, I though we were pointing up in the air. Let's hurry up and get this burn completed. We have been down among them, babe. You've got to start doing that earlier.
CHARLIE BROWN Charlie, you reading me?
SNOOPY I'm reading you, do you read me?
CHARLIE BROWN Yea.
CAPCOM Okay you guys, give it to them.
CHARLIE BROWN Okay, we can go into 40. Houston, Charlie Brown. They're going to a P40 now.

CAPCOM Roger, we copy them, Charlie Brown. That you much.
CHARLIE BROWN Rog.
SNOOPY Minus 12710 (garbled) minus 58.0.
CHARLIE BROWN Okay.
SNOOPY Yea, we're doing auto maneuver. Verb 70. Okay verb 70 now call verb 78 in there, babe. Okay. 4 minutes. The AGS good for a take over. The AGS is good for a take over. Okay, let me open and close this breaker.
CHARLIE BROWN Okay. (garbled) end your gimbal in able.
SNOOPY Ending gimbal in able.
CHARLIE BROWN Throttle man.
SNOOPY Throttle going to man.
CHARLIE BROWN Throttle control to auto.
SNOOPY Throttle contol is auto.
CHARLIE BROWN Manual throttle commander.
SNOOPY Go.
CHARLIE BROWN Balance couple on.
SNOOPY Go.
CHARLIE BROWN Descent engine overide command off.
SNOOPY Go.
CHARLIE BROWN Have your push buttons all reset.
SNOOPY Yep.
CHARLIE BROWN Garbled. all reset. Garbled.
SNOOPY Garbled.
CHARLIE BROWN Okay, ECS inverter number 2, closed.
SNOOPY That's over there.
CHARLIE BROWN No it isn't. Inverter number 1 closed. I'm sorry. You got it.
SNOOPY Yep.
CHARLIE BROWN Okay, descent engine override coming closed. AELG's coming closed. Abort stage coming close. Okay, Tom, if Delta T to go is less than 5 we RCS it in 03 minutes. If Delta T to go is greater than 25 we GOT stage in (garble).
SNOOPY Yep.
CHARLIE BROWN (Garble)
SNOOPY Right.
CHARLIE BROWN Now if we have to go to APS I've got the staging procedure 9 right here. If they have to burn it in ... we'll phase it and burn it in AGS and go. If we're burning out that ... we'll burn it in AGS.
SNOOPY Garbled.
CHARLIE BROWN Have you got your landing radar on?
SNOOPY Garbled.
CHARLIE BROWN You ought to pull that breaker.

SNOOPY — No, it stays on ... Garbled.
CHARLIE BROWN — Right.
(Garbled)
CHARLIE BROWN — Okay, 146 to go. ... of 176 feet per second. Okay, 130. Go. Tom. we're going on by so you can meet us.
SNOOPY — John, how do you read?
CHARLIE BROWN — Loud and clear.
SNOOPY — We are being cut out but I assume it's loud and clear.
CHARLIE BROWN — Okay, Tom. Coming up on 35 seconds engine RP set?

END OF TAPE

SNOOPY Loud and clear. Okay, Tom, coming up on 35 seconds, engine on descent, deadband in and AGS band okay, auto on AGS, AGS attitude looking good, Okay, the AGS is looking good, there is your AGS attitude in good shape. Okay and I'll ....the burn. The whole burn time is 40 seconds. I'm ready. Back to 99, proceed, ullage. Okay, we're burning, John. We're burned.

CC Snoopy, so we copy.

SNOOPY It's the gimbal light. Forget it Babe. We've got an engine gimbal light, but everything is good. Still burning. 149 to go. Okay, throttle it up. 127 to go.

CC How the attitude?

SNOOPY 107 to go. 86 to go. 40 to go, 40 to go. Shut down. Okay, the count is 1.5 feet per second. Let me know and I'll go to AGS attitude hold. AGS attitude hold. ..... That's good. Let it go, right there. That's good. That's got it, Babe. Plus .2, minus .5 and minus .9. The burn is good, John.

CHARLIE BROWN Roger. I understand. The burn is good. And Snoopy, we copy, your residuals. Over.

SNOOPY Roger.

SNOOPY You did real good then. The burn was steady, we had a descent .... light on twice, we had the engine gimbal light on, the master ..... and all those good things and then we just pressed right on. Over.

CC Roger. We copy.

CHARLIE BROWN Verb 82, enter.

SNOOPY Okay .....Okay. Houston, we are in a 19.8 by 11.8.

CC Roger. We copy.

CHARLIE BROWN Okay, Tom, verify your engine ... , stop quantity off, Okay, Babe, You've got news. I want to take my helmet and gloves off.

CC I've got it, Snoopy, Houston. We missed the Verb 79.

SNOOPY Roger. Just went in.

CC Okay, we got it. Thanks, Tom.

CC Hey, Snoopy, Houston, the Comm is really great and we got all our data now and during the good point though, boy you were way down in the mud, but everything is copasete now. Over

SNOOPY Charlie, I fought with the S-band antenna to get it for you, but it's the best I could do

SNOOPY I got the strongest strength OMNI when we were down there and after we passed I gave S Band another try and we came in good, because I thought you'd want to see the burn.

CC We appreciate it and thanks much, Snoopy, and it looked great.

SNOOPY Houston, this is Snoopy, and I thought you'd like to know that we have taken so many pictures and both cameras have failed on us.

CC Roger, we copy.

CHARLIE BROWN --the hack needles - give you a hack on where it is. On 180 and PITCH down 90. I know that. Okay, Tom, clean up your breaker panel, PCNGS landing radar open, air control decker power open, ALD open, inverter No. 1 open, and my descent engine override is coming open, my AELD is coming open, my .... stage is coming up and I am going to disconnect the battery. Stand by.

SNOOPY Pretty good bird, you know it? Hey how about RCS? What have we got quantity wise?

CHARLIE BROWN 92 and 82

SNOOPY Fine, that's no problem, Babe. Piece of cake. Waiting to get to that attitude and we'll pick up P... 120 upside down.

CC Charlie Brown, Houston, we've got a backup insertion pad if you are ready to copy. Over.

CHARLIE BROWN Roger, go ahead.

CC Roger, Charlie Brown.

CHARLIE BROWN Go ahead.

CC Roger, Charlie Brown, backup insertions. SPS, G&N, NA down to 933, 933 is 102580100 plus 01700 plus all balls minus 00710180262002 NA down to DELTA VC and DELTA VC is 01718. Rest of the pad is NA. Your ullage is 4 jets, 10 seconds. Got a CSI time, a 103 4400, TPI time 1053300 with an N equal to 1. Over.

CHARLIE BROWN Roger. SPS, G&N, nonapplicable down to times burn 902580100 plus 01700 plus all balls minus 0710180162002 DELTA VC 0701718, 4 jets, 10 seconds, CSI, all three 4400, TPI 2053300, N equals 1.

CC Good readback, Charlie Brown.

CC Charlie Brown, Houston, confirm DELTA VC and 981 minus 00710.

CHARLIE BROWN Minus 2 balls, 710.

CC Okay. Fine. You have been breaking up a little bit, John, we missed one of those zeros.

SNOOPY Hey, there, are you pitched up?
CHARLIE BROWN That's affirm. I'll get there. Am I pitched up? I've been tracking attitude right now.
SNOOPY Hey John, you may have to go down and reset that rendezvous radar transponder. Over.

END OF TAPE

CAPCOM Hold it John we're getting it.
SNOOPY Hello Houston, Snoopy.
CAPCOM Go ahead, Snoopy. Over.
SNOOPY Did you take a look at 0649's what we got there?
CAPCOM Roger, we're looking at it. Stand by.
SNOOPY The first one was a small number, .4 and zero.
CAPCOM Roger, copy. .4 and zero on the first, it looks big numbers now. Snoop, Houston. While we're looking at this, would you - are you ready to copy on insertion pad? Over.
SNOOPY That's affirm. I am and I'd also like to give - you give me an update on ALS and sunrise.
CAPCOM Roger. Stand by. Your insertion pad TIG starting with TIG 102550140 minus 01832 plus all balls minus 01235. Delta VR is 02209015 minus - correction Roll is 180233 minus 01818 plus all balls minus 01255 rest of the pad is NA. Standing by for your read back, over.
SNOOPY Okay. You got any word on that noun 49. We're loosing some tracking time we'd like to try out.
CAPCOM Roger, stand by. We want you to reject that mark with the big numbers and stand by on the others. Snoop, Houston. We have LOS time for you of 1 zero - 1 zero 137. Sunrise time of 1 zero 14 zero, over.
SNOOPY Okay, I got it.
CAPCOM And how's the P20 doing now? Is it taking good marks?
SNOOPY Yea, it looks like it is. We just got our second mark and, wait a minute. Yea, it looks good. It' 3 tenths of a foot per second. And I'll read the pad back if you'd like. Houston, are you ready for the pad?
CAPCOM Rog, go.
SNOOPY Okay. Insertion is 102550140 minus 01832 plus all balls minus 01235. 02209015180233 minus 01818 plus all balls minus 01255 and that's it.
CAPCOM Roger, that was a good read back. Snoop, Houston. We're satisfied with the way the rendezvous radar is updating the state vector in P20 now, over.
SNOOPY Okay, Charlie. Thank you. Houston, Apollo 10. The zeox is track and now looks real good and real solid.
CAPCOM Roger, Snoop. It looks good to us. Your range is coming right in there.
SNOOPY Roger.

CHARLIE BROWN Okay, I'm tracking you guys optically. It's really working good.

SNOOPY Have you got our flashing light, John?

CHARLIE BROWN Yeah, it's beautiful.

SNOOPY Houston. Just for information everytime we loose track with the S-band antenna it happened to bang into stops. It pops the S-band antenna circuit breaker on 16. It's done that about 3 times.

CAPCOM Roger.

SNOOPY But it seems to recover all right.

CAPCOM Roger. Snoop, Houston. That's a normal -

SNOOPY Hey, I'm going on the antennas at this time.

CAPCOM Roger, we copy on the OMNI's and that's normal indication for the steerable when it goes under a stops it will pop that breaker.

SNOOPY Okay, let's go to purge 401 noun 72 inner (garbled).

END OF TAPE

CHARLIE (garbled) this is Charlie.
SNOOPY (Garbled)
SNOOPY That's unbelievable isn't it? It's like a thing out there on a string where you can touch it. Where the hell are we going?
CHARLIE You're there, you're there.
SNOOPY Man are we there. This one happened so good, it's just pathetic.
CHARLIE Okay, ready?
SNOOPY Yeah, that's good. Don't even trim it.
CHARLIE We're going to go to PGNCS, volts.
SNOOPY Yep.
CHARLIE That's good. PGNCS and volts.
SNOOPY Did you guys turn off your tracking light?
CHARLIE No. No we maneuvered.
SNOOPY Okay, I guess you maneuvered because I don't see you.
CAPCOM Okay.
SNOOPY The ... on this thing is really bad. It won't stand it.
CAPCOM Snoop, Houston. We read you about y. Over.
SNOOPY Roger, Houston. This is Snoopy. We're starting a mark on ... now for our P52. Over.
CAPCOM Roger, Tom. We copy in the P52. Over.
CHARLIE BROWN Standby, Tom.
SNOOPY Go, Roger.
SNOOPY Okay, ...
SNOOPY Batteries went dead.
CHARLIE BROWN Now he's what?
SNOOPY Haselblad batteries dead.
SNOOPY One of the film packs jammed.
SNOOPY Now he's moved in.
SNOOPY Go to mark 1, what?
SNOOPY Mark 1.
SNOOPY Mark Y, Gene?
SNOOPY Mark Y.
SNOOPY Mark Y, Gene?
SNOOPY Mark Y.
SNOOPY Boy, no wonder John's going blind.
SNOOPY That in 1?
SNOOPY It's in 1.
CAPCOM Snoopy, Houston. To improve the com, we'd like you to go to S-BAND of voice and S-BAND ranging off. Over.
SNOOPY Roger. S-BAND voice off and S-BAND ıging off. Over.

CAPCOM And Charlie Brown, Houston. When you lose the high gain, then go to omni DELTA. Over.

CHARLIE Roger. Omni DELTA.

SNOOPY Charlie, this is Snoop.

SNOOPY Hello, Houston. This is Snoopy. How are you reading now?

CAPCOM Roger, Tom. You're about 3 by 5 now. A little bit better now. Over.

SNOOPY Roger, Charlie, I'm reading you loud and clear now. Over.

CAPCOM Roger. We - we have low bit rate. That's all Snoop. When you get through P52, we'd like your torquing angles.

SNOOPY Roger. And on the first auto maneuver on the ..., Houston, ... it put the article right on the very center of the star there, so it looks like our first aligning was beautiful.

CAPCOM Roger, Snoop. We copy. Over.

SNOOPY And we're now marking on Antares.

CAPCOM Rog, Snoop. Out.

END OF TAPE

SNOOPY Hello, Charlie Brown, Snoopy. Are you calling?

CHARLIE BROWN Static.

CC Charlie Brown, Houston. Go ahead. Read me about 3 by. Over.

CHARLIE BROWN Static

CC Charlie Brown, Houston, Read me again. Unreadable.

CHARLIE BROWN Static.

CC Roger. We see you at P20. Over.

CHARLIE BROWN Static. Houston, the star angle difference is 4 balls 2. Houston, are you reading?

CC Roger. Go ahead. 4 balls 2 on the triangle difference. How about the torque angles?

CHARLIE BROWN Okay. ...00169plus 00050 plus 3 balls 66.

CC Roger, we copy, Snoopy. Out.

CHARLIE BROWN Static.

CC Charlie Brown, Houston, we are satisfied with your P20. Your APS looking good to us. Over.

CHARLIE BROWN John, you are fairly readable. Stand by. We might have an antenna problem.

CC Charlie Brown, Houston, we are ooking up your tailpipe there and ....pretty bad. Do ou copy, Charlie Brown. We are looking up your tailpipes, the COMM is pretty bad.

CHARLIE BROWN Houston, Charlie Brown, ...static.

CC Snoopy, go ahead.

CC Charlie Brown, Houston, we'll have LOS at 10136. We'll see you over the hill at 10222 and Snoop LOS for you 101 correction 10137 AOS 10225. Over.

SNOOPY This is Snoopy. Roger. We got that.

CC Roger. And Charlie Brown and Snoopy as you are going over the hill, all the systems are go. We also go here on the ground. And it's looking great. Over.

SNOOPY Thank you, Charlie. Snoopy is go here. Our P52 is complete, we are going to pick up P20 again.

CC Copy.

SNOOPY Hey, Charlie Brown, this is Snoopy. I guess we are about 150 miles from you.

CHARLIE BROWN Roger.

SNOOPY And our P52 is complete. We coming over the star tracking on you.

CHARLIE BROWN Static.
CC Charlie Brown, this is Houston. Did you get your AOS LOS times? Over.
CHARLIE BROWN Static.
PAO And we have lost the signal on Charlie Brown. About 40 seconds away from losing the signal with Snoopy. And Snoopy has gone behind the moon now on the 13th lunar revolution. We acquired Charlie Brown first, he reported that Snoopy had reported the DOI burn and that he felt it was a good one. And then when Snoopy came within range, Tom Stafford and Gene Cernan confirmed that the descent orbit insertion burn had been on time and they were reading an onboard orbit of 61.2 by 9.2 nautical miles. They were down among the boulders, obviously very impressed at what they were seeing. Communications were bad ------.

END OF TAPE

PAO - what they were seeing. Communications were bad a large part of this pass as we lost lock on the high gain antenna. Then shortly before the phasing burn you could hear Gene Cernan calling out the checklist for the burn to Tom Stafford. They were on what is called vox voice operated circuits talking to each other on board. We had a good phasing burn. This maneuver coming slightly more than 10 minutes after Snoopy had passed over landing site 2. He reported that both cameras aboard Snoopy had failed during this low pass. This phasing maneuver will put Snoopy behind and below Charlie Brown. The Descent Orbit Insertion had placed Snoopy out ahead. Now they've burned into an orbit with an appacynthion of 190 nautical miles and a pericynthion of 11.8 nautical miles. So Snoopy will start dropping behind and will go behind and below Charlie Brown. To reach the position where it will have the same lighting and the same position as the Lunar Module on Apollo 11 will have after liftoff from the lunar surface. This phasing maneuver was done at 10% throttle for the first 26 seconds and then full throttle. You heard Gene Cernan call off the numbers of the Delta V as it burned down. Acquisition for Charlie Brown will be at 102 hours, 22 minutes, 22 seconds and for Snoopy 102 hours, 25 minutes, 37 seconds. Not quite 45 min- tes from now. The next maneuver to be performed will be taging which will come near 102 hours, 45 minutes. We have tape of a briefing by Pete Frank, Flight Director on the shift preceeding this shift and there has been a request that we play that on the release line. We'll do that now.

"Press Conference Transcribed Separately."

END OF TAPE

PAO This is Apollo Control at 102 hours, 21 minutes. We're about a minute away from acquisition of Charlie Brown. About 4 minutes away from acquisition of Snoopy. Snoopy will be making another low pass over the lunar surface this time on the order of 11 nautical miles, and will perform staging, jettisoning the descent stage, and then 10 minutes after descent stage the insertion maneuver. This maneuver is designed to retrograde maneuver, and it's designed to bring down the high ... that we achieve with the phasing maneuver. This ... was necessary to put the lunar module behind Charlie Brown, and now we want to bring that down from about 190 miles to 145 miles - put it in an orbit, the same orbit that's planned for the lunar landing insertion orbit. And with that maneuver Snoopy will start catching up with Charlie Brown.

CAPCOM Houston, over.

CHARLIE Roger. I'm looking at 316.45 miles on the - on the radar right now.

CAPCOM Roger. We copy. We'd like you to go to POO in ACCEPT.

CHARLIE This thing is working.

CAPCOM Roger. We'd like you to go in POO and ACCEPT. We have a state vector for you and a change on your back up insertion pad if you're ready to copy. Over.

CHARLIE Go ahead, over.

CAPCOM Okay. DELTA-V X and then 981.

CHARLIE Go ahead. Over.

CAPCOM Roger. DELTA-VX and 981 changes to plus 01720. Over.

CHARLIE Roger. Delta VX plus 01270.

CAPCOM Roger. That's negative.

CHARLIE Yeah, I just barely read you there Snoop.

CAPCOM Charlie Brown, that was a bad readback on the DELTA-V.

CHARLIE Say again. Over.

CHARLIE Say again, there, Charlie.

CAPCOM Rog, John. It's plus 01720. Over.

CHARLIE Rog. 01720.

CAPCOM That's affirm.

CAPCOM Charlie Brown. This is Houston. I cut you out at the beginning of the pass. Say again what you were going to say. Over.

CHARLIE Nothing important. I'm about to lose - I just lost range and went to 320.50 miles, and I'm no longer in voice contact with Snoopy. I think we're just flat out of range.

CAPCOM Roger. We copy.

CHARLIE I can hear him very faintly in the

CHARLIE background.
CAPCOM Roger. Charlie Brown, this is Houston. It's your computer. We're through with the load. Over.
CHARLIE Roger. Thank you.
SNOOPY Hello, Charlie Brown, Snoopy.
CHARLIE I'm just about to lose you there.
CHARLIE Hello, John. Do you read us?
CHARLIE Just barely, you guys. Did you stage?
CHARLIE Houston -
SNOOPY Houston, this is -
CHARLIE Go ahead, ...
SNOOPY Hello, Charlie Brown, Snoopy. Do you read?
CHARLIE Roger. Read you loud and clear now. Weak but clear. I read you guys.
SNOOPY Hello, Houston. How do you read Snoopy?
CAPCOM Roger, Snoopy. Reading you 5 by. Over.
SNOOPY Roger. Will you ask Charlie Brown if he's still in track attitude. I can't get any lock on at this distance out here. Over.
CAPCOM Roger. He had you, he broke lock at 445 miles on the VHF. Stand by. We'll ask him on his attitude.
CAPCOM Charlie Brown, Houston. Are you still in tracking attitude -
CHARLIE BROWN Roger.
CAPCOM Charlie Brown are you -
CHARLIE I'm in attitude 180 which is where -
CAPCOM Roger.
CHARLIE Supposed to be right now.
CAPCOM Roger, Charlie Brown. We copy. Snoop, Houston. He's in attitude as called for out in the flight plan. 180 pitch. We got your ascent looks good, the ascent battery looks good. Over.
SNOOPY Roger. We've just pressurized the ascent tanks and they look good.
CAPCOM And roger. If you'll give us your computer, we need POO and data. We have a state vector for you.
SNOOPY You've got it.
CAPCOM Copy, Snoop. Out.
CAPCOM Hello, Charlie Brown. This is Houston.
CHARLIE Is there some attitude?
CAPCOM Charlie Brown, this is Houston.

CAPCOM We show you loaded TIG incorrectly. In P30, TIG is 102550140. Over. Correction, correction -

CHARLIE It may be 102 -

CAPCOM Charlie Brown, that was my fault. TIG time is 102580100. Over.

CHARLIE Roger. 0100.

CAPCOM Afirm. Out.

PAO That's the ignition time if Charlie Brown has to perform the maneuver in case Snoopy can't.

CHARLIE Okay, how does that look to you?

CAPCOM Looks real fine, Charlie Brown.

CAPCOM Snoop, Houston. We got the load in. The computer's yours. Over.

SNOOPY Roger, Houston. Thank you very much. And, Houston, this is Snoopy. We've got about 14 minutes to staging. I'm going to go ahead and maneuver to staging attitude.

CAPCOM Roger, Snoop. We copy. Can you comment on your cameras. We might be able to help you out on those. Over.

SNOOPY Roger. On the Hasselblad it looks like both batteries have gone dead. Over.

CAPCOM Copy. Both batteries dead on the asselblad. How about to sequence?

SNOOPY Okay, on the sequence, I've got 2 phil packs that you have to practically jam, ... or step on them to get them to make electrical contact so the camera will run. I've got one of them to run and I'll try to get the other one to run.

CAPCOM We copy. Thank you much. We'll work on it for you. Out.

SNOOPY It's just hard to do that when you're coming across a landing site, you expect it to work.

CAPCOM Rog, Gene. We copy.

SNOOPY And Snoopy's going to maneuvering at this time.

CAPCOM Roger.

END OF TAPE

PAO We're 11 minutes away from staging and 21 minutes away from ignition for the insertion burn.

CHARLIE BROWN Hey, you guys must be about 450 miles out would you.

SNOOPY On the line and all the descents off. Charlie Brown, Snoopy. Over. You ready. 2 tenths to vertibelt full egress. Hem and repress valve closed. Okay, I'm ready - golly - Okay, descent 02 closed. A ascent 02 number 1 open. Okay, Rags A and B to egress. Okay, water tank select asset. Okay, I'll check the asset batteries. Oh, I'm on a dead phase, Tom. TR dead phased. Okay, on your side AP bus A decca gimbal open. Height display thrust open. Propulsion descent helium reg vent open. Heater landing radar open. Staff control decca power open. Tings landing radar open. Okay, let's take another look at those APS temperatures and pressures. I guess they look all right to me.

CAPCOM Snoop, Houston. The APS looks good to us, over.

SNOOPY Okay. Roger, Houston. We're about 4 minutes and 23 minutes from staging. Take Tom and let's get out of here. The clocks set.

CAPCOM Snoop, Houston, over.

SNOOPY Go ahead, Houston.

CAPCOM Roger, we copy 8 minutes to staging. Over.

SNOOPY Roger, 8 minutes mark now 759, 58. That's affirm. We're with you. That was my mistake. It's 4 minutes to our 14 minute check. We're 8 minutes to staging, 750.

CAPCOM Copy, out.

SNOOPY Just like to think ahead. Okay, Tom. Staging attitude should be -

CHARLIE BROWN This is Charlie Brown. You'll have to keep me posted on what Snoopy's doing. I can't read them anymore.

SNOOPY - about 250 upside down.

CAPCOM Roger, Charlie Brown. Snoop's going through his staging checklist. He's got 7 minutes to go before staging.

SNOOPY Yes, I can read you Houston, that mother may give us a kick. Okay, Tom. If you get a chance reset my orb rate ball will you coming down. AGS agrees with the PGNS on that one. 39, I'm way off now. I'm about 290. There's 270 coming up on 240, a little more. That's good. Right there, stop it. It's 1534, Tom. At 14 minutes you get the master arm on and we'll leave

SNOPPY it on remember right on through the insertion burn. And I'll set the DPS. Matter of fact, if you stay in AGS I'll go ahead and set it now. Okay. In AGS, I'll set the DPS.

CAPCOM Snoop, Houston. We have you go for staging, over.

SNOOPY Over. Roger, do you have an update on the LM weight?

CAPCOM Roger, Snoop. Your LM weight is 8290 over.

SNOOPY Roger, got 8290. Thank you. Hey Tom, that's good enough for CSM weight. So, that's it babe.

CAPCOM Charlie Brown, Houston. We got it showing the high gain now. Snoop's 3 minutes from staging, over.

CHARLIE BROWN Roger.

SNOOPY Okay, babe. Let's run through it, right up to staging. We've gone through - you want to double check these? Yep. Hem against the vertibelt full egress. Hem and repress close. Descent 02 closed. Ascent number 102 open. Pressure AGS both egress. Power tank ascent, ascent water open. I opened that and descent water's closed. I closed that. I checked the voltages, we're dead phase. We're on ascent batteries and the voltage looks good here. You got your breakers pulled on that side. Yep. At 14 minutes put your master arm on. Extra inflation 2 jets. Time control AGS. And you're in attitude hold ..... so for staging - actually be up there if you want. I think that would be better for staging otherwise you're going to bang those thrusters all over the place. Then I should be looking at 270 upside down and you looking at 295 upside down. I'm coming right in. Okay, and at the DAP is set I'll call up P47 at 11 minutes.

END OF TAPE

SNOOPY Let's take another look at the damp, Tom. 12002. Let's go. Okay. Call 47 in 1 minute. Okay, Tom. I'll thrust APS, 2 feet per second. I'll stop, I'll start thrusting forward and you stage fire. Got your master on mark?

CHARLIE BROWN My attitude looks good. I'm coming up on 270 upside down.

SNOOPY And yours is looking good.

SNOOPY There it is. That way and then that way, right? Because we're going to be awful light. Stay out of there, Babe. Noticed that last attitude. That's the time you want to go. The damp was set for a light vehicle. We'll do it this way. Okay, you ready? Okay? Son of a bitch. Okay, let's make this burn on the AGS, Babe. Make this burn on the AGS.

PAO We see staging.

SNOOPY Got a good staging. Let's make it on the AGS. Got in the gimbal lock? She didn't go., eh? That stage. That poos up, Babe. Okay, our angles -- You didn't lock, eh? Something is wrong with that gyro -- Okay. ROLL is 180 and PITCH is 233. 233. Better put my ball on inertia just to check that out. Verify it, too. I can't reach it. But if I could put mine, you could verify it on the AGS.

CC Snoopy, Houston, we show you close to gimbal lock.

SNOOPY Yes. Something went wild during that phasing and we are all set. We didn't lock it. We are going ahead to auto maneuver.

CC Roger.

SNOOPY Babe, I don't know. Let's put my AGS in inertial to verify that we are at the right attitude, Babe. Okay, just do it in inertial. Okay, in case we have to go to it, that's what we want. Let's get that AGS. Wait a minute got to get this damn thing.

SNOOPY Charlie, how is the staging?

SNOOPY ... wait until that thing blanks.

CC Charlie Brown, Houston, they're staging. Had a wild gyration, but they got it under control.

CHARLIE BROWN Roger.

SNOOPY Are the AGS in inertial, Tom?

Okay, that's good. Had a lot of time. 7 minutes. I don't know what the hell that was, Babe.

CC Snoopy, Houston, you are looking okay for the insertion burn.

SNOOPY wait a second, I just got.
SNOOPY Roger, Charlie, that was something we've never seen before. It was real good. We went to AGS and ---
SNOOPY The computer is yours, Tom. I already went through P30, go on to P40.
SNOOPY Let me tell you what happened real quick as we come around to this insertion burn. Now, the attitude deadband started thrusting up and the thing just took off on us.
CC Roger. We copy.
SNOOPY And I could see it was coming up, I got ahold of it and tried to avoid gimbal lock and I guess I did. Looks like we got a good insertion out of it anyway. I mean, a good staging out of it and we are all set to go for insertion here.
SNOOPY Okay, Tom, call off 686.
SNOOPY Okay, the computers is yours. We're going backwards. Just the way we want to go. I'll tell you. There was a moment there, Tom, but let's worry about it after we make this burn. I want to make sure is AGS is up for it. Okay.
SNOOPY Houston, stand by for a mark, 5 minutes to the burn. Mark, 5 minutes to the burn. Over.
SNOOPY Okay, Charlie, we're with you. I think we have got all our marbles.
SNOOPY Gee, it sure coming down to that ground, I'll tell you. I don't know, but I hope we never find it again. I'll tell you, that was wild, Babe. And it wasn't the DAP because you were in AGS. That was AGS. Yes, why deadband? That's where we are going to stage. Okay, Babe, I've got good AGS and everything is looking good. I've the attitude set so if we have to switch, we'll be all right. Okay, 407 on our monitor till the burn. We are 4 minutes. Okay. 4 minutes. Boy that is hard to do with helmet and gloves on. Give me a monitor and add that pressure 1 and 2. Let's take another look at it. That's looking good. Just stop pushbuttons, all reset and then an onboard stage reset. Buttons reset? AGS translation, I mean AGS translation 4 jets. Okay, Tom.
CHARLIE BROWN Houston, I'm not reading them, so if they don't make it, you've got to tell me, eh?
CC Roger, they are counting down. Looking good, Charlie Brown.
SNOOPY Okay, Tom, if we don't miss at 170 feet, if we've got more than 170 feet per second to go, we are in RCS, RCS maximum of 55 seconds.

SNOOPY greater than 170 where RCS is back to our pad DELTA V, which is going to be P40 there. AGS is looking good. And our pad DELTA V is 220.9, so if we burn less than 170 feet per second, if we don't get up to 170 feet per second go ....burn it back about 220 Let's get in at 130 feet per second region. Okay, put push your inverter No. 1 closed circuit breaker at 1 minute your stab control or AALB closed. Well, I'll tell you, we are down among them again on backwards, you know that? Look at that rill. That's got to be probably Diamondback right there.

END OF TAPE

CHARLIE BROWN That's got to be probably Diamondback right there. It's awful close to see that.
CHARLIE BROWN Okay, Babe. Coming up about two minutes. I'm closed.
CHARLIE BROWN Okay, 2 minutes, Babe. Give it a final trim.
CC Okay. Here it is.
CHARLIE BROWN Okay. My AELD is coming close Tom.
SNOOPY Okay. And verify your burning No. 1 breakers closed.
CHARLIE BROWN Okay. At 35 seconds, we want the engine arm to ON.
SNOOPY And PNGCS to AUTO.
CHARLIE BROWN Went right into the attitude, Babe, and Engine arm yet to go. Coming up on 112.
CC I got 99. I'll cut you down.
CHARLIE BROWN Burn time is 15 seconds, so it's going to go in a hurry.
SNOOPY 220 feet per sec. 220.9. 50 seconds 48. Baby, let's make this one.
CC There's 35 seconds.
SNOOPY After arm into ON ascent AC control at AUTO dead band mirror we're stuck for this attitude on a burn and cut down at 500. Okay Baby. 9 8 7 6 5 99 3 2 1 burn. Burn. Okay. 160 to go.
CC Roger. You are burning.
CHARLIE BROWN 134 to go.
CC You're burning, you're burning.
CHARLIE BROWN 100 to go. 78 to go. 50 to go. 20 to go. Stand by, Tom. Okay, I'll null them out. Oh beautiful. Beautiful. Beautiful.
CC Charlie Brown. Houston. You got the burn off. We're in good shape.
SNOOPY Outstanding. My congratulations to (inaudible)
CHARLIE BROWN Point 3 1 point 1. Baby that made me feel better.
SNOOPY Call VERB 82 when you have a chance.
SNOOPY AGS says we made a good burn.
CC Snoop. Can we copy the residuals. It looks great.
SNOOPY We've got it. Oh Roger. The burn looked real good.
SNOOPY I Tell you we're down here where we can touch the top of some of the hills though.
CC Houston. Under cases like this it sounds like to me you can relay through him because every time you talk to me I hear him talking in the background.

SNOOPY Okay, Houston. This is Snoopy. Shows us in 46.7 by 11.0, over.

CC Roger, we copy. 46.7 by 11.0.

SNOOPY Okay, turn engine arm OFF AELD breaker open and master arm OFF and inverter No. 1 open. Okay, and the RCS just for the record from 80 and 78. Boy, I tell you I thought we were wobbling all over the skies. Suprised those residuals ended up where they did.

CHARLIE BROWN Okay. Yaw 180 and pitch down 90.

CC Hello, Charlie Brown. Houston. Can you hear them talking when I keep keyed down here. Over.

CHARLIE BROWN Yes, a lot better. I thought all of a sudden - that was great.

CC Okay. When they start talking I'll key down here and relay to you. Over. Until you get them again.

CHARLIE BROWN Okay, that will be kind of you.

CC Rog.

CC Charlie Brown, Houston. We recommend for your next maneuver you should load your DAP with a half a degree per second. We see point 2 now. Over.

CHARLIE BROWN Okay, Roger. I'm going to do that.

CC Okay.

CHARLIE BROWN Houston. Is he in a 283 by 15.3. Over.

CC Negative. We've got him at 46.7 by 11.0. Over.

CHARLIE BROWN Roger. I must have loaded this number backwards. This P76 number backwards.

CC Roger. We'll send you a TM vector in just a moment. Charlie Brown we've got your LM vector coming. Stand by.

CHARLIE BROWN All righty.

CHARLIE BROWN We're in POO and ACCEPT right now.

CC Roger. Copy Charlie Brown. Stand by. Be a while.

CHARLIE BROWN Okay. I can do the realign in the meantime then.

CC Charlie Brown, Houston. Stand by 30 seconds. We'll have the load to you. Over.

CHARLIE BROWN Roger. I'll wait.

CHARLIE BROWN Oh Houston. That's outstanding. Wished we had done that when we were full with the GSFC.

CC Roger.

END OF TAPE

CHARLIE Are you done with it?
CAPCOM Stand by.
CAPCOM Roger. Charlie Brown, you can take the computer back. We're done with the load.
CAPCOM Charlie Brown, Houston. We're through with the computer. It's yours, over.
CHARLIE Thank you much.
CAPCOM You're welcome.
CHARLIE That's more like it.
SNOOPY Houston, we're going to OMNI's we're doing a P52 the rest of it.
CAPCOM Roger, we copy. We want AFT omnis, AFT omnis. Over.
CAPCOM Snoop, Houston. AFT omnis if you read. Over.
CHARLIE They want you on AFT omnis, Snoopy.
CHARLIE Houston wants you on AFT omnis. Okay, he's on AFT omnis, Houston.
CAPCOM Roger. We copy, Charlie Brown. Can you read him now, Charlie Brown?
CHARLIE Yes, I am. Thank you.
CAPCOM Snoop, Houston. Over.
SNOOPY Go ahead, Houston. This is Snoopy.
CAPCOM Roger. We think we can help you syche out your problem there at staging. It looks like the mode control switch was in AUTO instead of AFT hold. Over.
SNOOPY Okay, we'll try to recollect it. I thought we went right through the checklist as prescribed, but if you've got telemetry, it'll sure help us.
CAPCOM Roger.
SNOOPY Houston. Results of the ... alignment. Do you read?
SNOOPY Okay, plus 4 balls 4, gyro torquing angles are 0 plus 00311 plus 00121 and plus 00081 and the (garbled).
CAPCOM Roger. We copy.
CHARLIE Snoopy, we're going to acquire - acquire you on VHF again.
SNOOPY Okay, we'll be ...
CAPCOM Snoop, Houston. We noticed on your checklist that minus 14 minutes prior to - prior to insertion, we have an omission on the mode control switch. It doesn't call out its position, and we think that's where we ran astray. Over.
CAPCOM Snoop, Houston. Over.
SNOOPY Go ahead, Houston.
CAPCOM Roger, Tom. Would you like some further amplification on the staging problem. We think the air came at minus 14 minutes where we failed to call out the

CAPCOM AGS mode control switch into AFT hold. Over.

SNOOPY Okay. Ready.

CHARLIE Okay, I'm coming around now, you guys. I'm probably not pointing at you right this second.

SNOOPY Yeah, we wondered what happened. We were locked in the quad and the radar slowly played it out. Now it's trying to come in, John, as you pitch up.

CHARLIE Okay.

SNOOPY Keep going. Those springs are building.

END OF TAPE

CHARLIE (garbled)
SNOOPY Okay, we've got a solid lock on it now, John, at 320.
CHARLIE Would you believe this thing is giving you a range in half steps.
SNOOPY And again on our first mark, we see these ... We'll reject them and pick up on our second ones.
CAPCOM Hello, Snoop, Houston. We have a CSI update for you. Over.
SNOOPY Go ahead with your update.
CAPCOM Roger. It's P32 CSI 103455460 105210100 plus 0453 plus 000106 plus 453 plus 000 plus 005. Standing by for your readback. Over.
SNOOPY Give me 981 again. I don't think I got enough numbers.
CAPCOM Roger. 981 is plus 0453 plus 000. Over.
SNOOPY Stand by, Charlie. I'll give you a read back in just a second. This is in CSI and ... with you. Is that correct?
CAPCOM That's affirmative.
SNOOPY Okay, John, I got CSI TIG is 1034554. 105210100
CAPCOM Snoopy, Houston. You broke out on your readback after the noun 11. Over.
SNOOPY Stand by and I'll read it back. Let me get things going here, Charlie.
CAPCOM Roger.
SNOOPY I got enough to do, and I'll read it back in a minute.
CAPCOM Roger.
CAPCOM Charlie Brown, Houston. Over.
CAPCOM Charlie Brown, Houston. Over.
CHARLIE Go ahead, Houston.
CAPCOM Roger, Charlie Brown. On - we think what happened on your P76 where you got those funny numbers that you failed to do the final enter on the noun 84. Just a reminder to always do the final enter on the noun 84 and also when you get a chance we'd like you to cycle the tunnel vent valve to LM press for 10 seconds to try to blow out that RTV or whatever's clogging it. Over.
CHARLIE Rog. I tried that this morning.
CAPCOM Roger.
CHARLIE It didn't pass.
CAPCOM Roger. Did you try it after undocking. Over.
CHARLIE Yes, I'll try it. I haven't got a chance right this minute.

SNOOPY Hello, Houston. Hello Houston, this is Snoopy. Our updates are looking real good now. From the respect of DELTA-R and DELTA-V it looks like we're coming right up the part to expect a range in range rate. Over.

CAPCOM Roger. We copy, Snoop. Over.

SNOOPY Roger.

PAO We're showing a range of 182 miles now.

SNOOPY Hello, Houston. I guess you can read our DISKY on this first recycle after 5 marks.

CAPCOM Roger. We copy.

SNOOPY Hello, Houston. That last alignment was based upon 4 sets of marks rather than 5 because of our time to get locked on just at 30 minutes backup range rates, so we only took 4, 4 sets of marks on each star instead of 5.

CAPCOM Roger. Copy. That's okay, Snoop. Press on and Charlie Brown -

SNOOPY Roger.

SNOOPY No turning back now.

CAPCOM Rog. We copy. Charlie Brown, Snoop did you copy the noun 11 noun 37 info? Over.

END OF TAPE

CAPCOM - noun 11 noun 37 info. Over.
CAPCOM Snoop, Houston. We'd like you to confirm your noun 81 noun 86 info on the CSI pad. Noun 11 and noun 37 were in there correctly. We're satisfied with those. Over.
SNOOPY I'm sorry, Charlie. Noun 81 - I still think I got a left out digit, but I know what you're talking about. Noun 81 is plus 045.3 and plus all balls. Is that correct?
CAPCOM That's affirmative.
SNOOPY And the next number is 106 and then noun 86 is plus 453 plus all balls and plus 0005.
CAPCOM That's - roger. It's 2 balls 5 on - on the DELTA-VZ. Over.
SNOOPY If I was wrong, John, what do you see? What's that? Okay, John. I can't - I just don't believe that. I've been tracking the radar here. We're going right on the center line of the ball. Let's wait till after CSI and look at it.
SNOOPY Okay, on high ball was right in the center. We'll still have plenty of time, John, after CSI.
SNOOPY John, give me your CSMY data again.
SNOOPY Okay, got plus 6.4
CAPCOM Snoopy, Houston. We'll have LOS at 10336 and AOS at 10425. Over.
SNOOPY Roger. 10336 10425. Thank you.
CAPCOM Charlie Brown, Houston. Over.
PAO Showing range now, 165 miles as Snoopy closes on Charlie Brown.
CAPCOM Snoop, Houston. If you get a chance, pass to Charlie Brown, we've lost his PM in voice and we'll see him AOS at 10424. Over.
SNOOPY This is Snoopy. Roger. Charlie Brown, this is Snoop. You'll have acquisition at 10424. Over. Roger, you'll be picking up Houston at 10424. And I ought to - and I ought to play 4.1 and we're tracking in the other direction, and we're tracking right up this center line here. But we'll just ignore the first data play correction. Over.
CAPCOM Yeah.

END OF TAPE

SNOOPY Houston, I'm putting you omni.

CAPCOM Roger, Gene. Snoop, Houston. If you go over the hill, you're looking good. We're all go here.

SNOOPY Roger, that, with everything looking good, we're going to ignore the out of plane correction at CSI, be advised, over.

CAPCOM Snoop, Houston. Say again, we didn't copy.

SNOOPY Roger with everything looking good we're going to ignore the out of plane correction at CSI, over.

CAPCOM Roger. Understand you are not doing the CSI - the out of plane, over.

SNOOPY Afirm, okay, John. I understand 4649. Okay, that's all right. We know which way we're going to burn. We'll reverse this to out of plane. Okay, 15.4 .... It's coming up right now. Plus 4543. Okay, so we'll burn our 45.3. That's exactly what Houston gave us. We'll see.

CAPCOM Hey Snoop, CAPCOM. We understand you're burning the 45.3. Your fido's grinning.

SNOOPY It looks just great. Okay, Tom. That clocked it up. 10 minutes on your range rate burn. In range, both. We'll see how the backup's come up. Okay, mark it. It was 103 feet per second. Okay, 103.

PAO This is Apollo Control at 103 hours, 36 minutes and we've had loss of signal. As you heard the crew talking there right before LOS the on board solution for the concentric sequence initiation burn agrees exactly with the ground solution that we passed up to them, 45.3 feet per second. This burn coming at 103 hours, 45 minutes, 54 seconds while Snoopy is behind the Moon. This CSI burn is designed to make the LM's orbit such that the terminal phase initiation will come at the proper time and under the proper conditions after the constant delta height burn. We're actually programming this CSI burn to effect a maneuver 2 maneuvers away. The TPI. We want to be at midpoint of darkness at the proper time to do the TPI burn. As we acquired Charlie Brown on this revolution, number 14, he was reading 316 miles from Snoopy. He lost range and communications about 320 miles. For some time we relayed information back and forth. For a period he could hear Snoopy if the CAPCOM here, Charlie Duke keyed while talking with Snoopy, Charlie Brown could also hear the conversation. We got a good staging with some gyrations on the part of the ascent stage at that point. However, apparently a lot of roll and we think we have that figured out now. But the staging itself was good and the crew proceeded on to do the insertion burn. A very good burn. You heard Gene Cernan

PAO again calling off the burn checklist to Tom Stafford and the crew comments during the burn itself. Crew read on board after that burn 46.7 by 11 nautical miles. As soon as the Flight Dynamics Officer has taken a look at all the data that he collected during this pass, during which we were in communication we will pass on the grounds reading on that orbit. We'll next acquire Charlie Brown at 104 hours, 20 minutes, 29 seconds and Snoopy at 104 hours, 24 minutes, 48 seconds. This is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 104 hours, 18 minutes. We're not quite 2 minutes away from acquisition of the Command Module. We'll try to give you a - an explanation of what happened during the staging sequence. The backup guidance system, the AGS or Abort Guidance System mode control switch was in AUTO because the - the radar had been used to track the Command Module, and they were using the AUTO mode for reaction control system added to control. Now at - the - this mode control switch should have been placed in attitude hold for staging, but it was not because that step had been omitted from the checklist. So the control system maneuvered the Lunar Module to lock on to the Command Module as the computer directed, but that was not the proper attitude for staging, and the crew were not sure whether they went to pulse mode or to manual, straight manual control, but they went to one of those two modes to get out of that situation, and the staging went well. We're about 30 seconds away from acquisition now.

PAO The altitude at staging was 33.4 nautical miles.

PAO Gene Cernan was the only crewman in the LM being monitored by the flight surgeon, and his heart rate during that staging sequence ranged from 105 to 129.

CHARLIE You guys got 21 minutes counting them out. I was doing okay until the last hundred miles or so, and I had to put it in tight dead band, because when you start talking about things like flame changes, I want to be able to go back and look at the ball. I think we're in BAT right now.

CAPCOM Charlie Brown, Houston. We're standing by. Over.

CHARLIE Roger.

CAPCOM Charlie Brown, Houston. How did the CSI go?

CHARLIE (garbled) Boy this track in the LM against the background of the Moon or (garbled) something down there is really fantastic.

CAPCOM We copy, Charlie Brown.

SNOOPY This is Snoopy. How do you read me?

CHARLIE (garbled)

CAPCOM Hey, Snoop, Houston. We're reading you four by. Over.

SNOOPY (garbled) and we had a beautiful earth rise as you came up from behind the horizon.

CAPCOM Roger. Need your 98 - Snoop, Houston, need your 981 numbers and your residuals. Over.

SNOOPY Roger. Stand by.

SNOOPY Okay, for CSI the 981 numbers were

SNOOPY 454300 Residuals were 0, minus .4, and 0.

CAPCOM Roger, Snoop. We copy 454300. Residuals 0 minus .40. Thank you much.

SNOOPY Now we're going to start with the high gain.

CAPCOM Rog.

SNOOPY (Garbled) We copy that.

CAPCOM Charlie Brown, Houston. Did Snoop do a flame change? Over.

CAPCOM Charlie Brown, Snoop. Correction, Charlie -

SNOOPY (garbled) it's the flame change time, and at the flame change time which was 10415, I had minus 1.1 and they had plus. They had one in the opposite direction, so we decided not to do it there.

CAPCOM Roger. We copy.

SNOOPY Hello, Houston. This is Snoopy on high gain. How do you read?

CAPCOM Rog. We got you on high gain, Snoop.

SNOOPY Okay, this high gain stuff is a beat the cake. I don't know what you were all so worried about.

CAPCOM Wish we could say the same about the OMNI's.

SNOOPY Yeah, all I did was look at you coming over the horizon, and I pointed my high gain up and down my ZX's like I hoped I could, and man, there you were, and she locked on.

CAPCOM Roger. We got you, and we got you counting down, and we see you 16:45.

SNOOPY Okay, seems like everytime we initialize or call a P20 for the first time, the first mark we have to reject because it's got horrendous 5-digit numbers in it.

CAPCOM Roger. We copy.

PAO Showing range 97 miles.

SNOOPY It looks like TPI, my last recycle, TPI moved away from us 2 minutes and 20 seconds. I'm going to go and try calculating our flame change and compare it with yours, but it looks like we're in good shape. I got a Delta-H of 14.9.

CAPCOM Roger, Snoop. We copy. Houston.

PAO That DELTA-H is the differential in altitude between the Command Module and the Lunar Module and Gene Cernan reads it as 14.9 nautical miles. We'd like to be right around 15 nautical miles, so that's very good.

END OF TAPE

PAO In this next maneuver the CDH -
SNOOPY Charlie Brown, Snoop. We're locked on with you all the way. Right together.
SNOOPY Roger. You're right in plane with us now, Charlie Brown.
SNOOPY Hello, Houston. This is Snoopy. One thing that looks real good to us is the rendezvous radar temperature has kept fairly cool, in fact the way it is now, at 80 is about as hot as it's gotten all day. Over.
CAPCOM Roger. We copy, Tom. Thank you much.
SNOOPY Charlie Brown, this is Snoop. Our plane change is NG, so we're not going to burn ours. We'll wait for yours. If it sounds good, we'll look at it.
SNOOPY CDH time is 104435271.
CAPCOM Roger. We copy.
CHARLIE CDH 194435271.
SNOOPY That's it, Charlie Brown.
CHARLIE Okay, what I'm showing is minus 4.2.
SNOOPY John, (inaudible)
CAPCOM I don't either, John. We're going to ignore it here.
SNOOPY (garbled)
CHARLIE Yeah.
SNOOPY Ours was in the opposite direction even with the sign changed, but let's not burn it. You're right down to belly band, Babe.
PAO And we're 10 minutes away from the CDH maneuver burn that will make the differential altitude constant. Be a very small maneuver on the order of 2 to 2 1/2 feet per second. The ground solution is 2.3 feet per second. The crew is now getting solution from their computer.
SNOOPY Okay, minus 5 81 and a minus 5 tenths, 0 and minus 2.9, 3 plus 3.
CAPCOM Snoop, Houston. We see your solution. It looks supreme. Over.
SNOOPY Roger. They both look great. Yeah.
CHARLIE This is the nicest CDR .... This is the nicest CDR solution we ever got.
SNOOPY That's right, John. Looks like our CSI solution the total targety was just fantastic.
PAO The control officer reports that all of the LM comsumables are in good shape. We're showing a range now of 87 miles between the LM and the CSM.
CHARLIE ... AGS, huh?
SNOOPY Yeah, we're going to AGS. I want to make sure our attitude holds. We do all those before

CAPCOM Charlie Brown, Houston. Over.
CAPCOM Hello, Charlie Brown, Houston. Over.
SNOOPY Houston, go ahead. Charlie Brown's reading you.
CAPCOM Rog, Snoop. I'm not reading him at all. Notice - we noticed he bypassed his roll maneuver at about 104:33. We recommend he manually roll 180 before he does his P20 AUTO maneuver over, out to the burn.
SNOOPY He got that.
CAPCOM Okay, we barely heard him. Thank you.
SNOOPY John, we're 343, 342, counting down to the burn.
SNOOPY That's 2 minutes, John.
SNOOPY (garbled) How's that? Are you maneuvering now? Okay, we just lost lock understand.
SNOOPY Do what?
SNOOPY John, we're within 35 seconds.
SNOOPY 10 seconds. We're in AGS, mid deadband attitude hold. 4, 3, 2, 1 burning.
SNOOPY Burn was good.
CAPCOM Roger, Snoop. We copy.
SNOOPY Did you copy the residuals?
CAPCOM That's affirmative. We got it all. over.

END OF TAPE

SNOOPY Had you copied the residuals?
CC That's affirmative. We got it all. Over.
SNOOPY All fight. Okay, go back up, Joe, and we'll be all set to track.
SNOOPY Here we have a solid lock on,John.
SNOOPY Okay, Charlie Brown, this is Snoopy. I've had you in reflected thermal for about 90 miles odd and it was just very clean. It was just about the same as around the earth when we used to see the Agena. I've got you as a little yellow dot out there and I've been tracking you since about 90 miles. Over.
SNOOPY And I've got only one eye power.
CHARLIE BROWN Hey, John, after lining this platform with the ALT, I can see why your eyes -- why you are saying what you are saying. I'll tell you.
SNOOPY Houston, this is Snoopy. We are right over by Moltke and the landing site again. See the view of it now from 45 miles and again -- it's just extrapolated from below. It looks like we got about 25 to 30 percent clear area. Over.
CC Roger, we copy, Snoop. Over.
SNOOPY Roger, we are coming up through the craters Sophia and Ritter and we can see US 1 here on the side from US 1 again, rounded but the whole thing is dropped down just like reported before.
CC Roger, we copy, Snoop.
SNOOPY Houston, do you have a good gouge on a setting for internal film to use outside?
CC Stand by. Roger. Use 2F stop hard, Snoop, on that film and, Tom, if you've got a chance to talk a minute, could you describe Landing Site 2 from 8 miles. We did not have you in communications at that time.
SNOOPY Okay, Houston, go ahead. You were cut out. Say you want me to describe the Landing Site 2 again?
CC Roger. We can get it later, Snoop, it's a little busy now. We'll get it later. We were out of communications with you at that time, but we will get it later. Over.
SNOOPY Yes. Okay. The approach end looks lots smoother than some of the Orbiter photos show. It's still estimate 25 to 30 percent semi-clear area for if the LM has enough upper tide, at least of what we can see at 50,000 feet, it should not be a problem. However if you come down in the wrong area and you don't have the hover time you are going to have to shove off.

CC We copy.
SNOOPY Okay, we've got solid lock on now and we're working on P34.
PAO Range is 71 miles. We're showing constant delta altitude of 14.94 miles between the two vehicles.
CC Snoopy, Houston, we don't read Charlie Brown. Will you relay that if he is in his 180 ROLL to try to high gain for us.
SNOOPY Roger. Charlie Brown, this is strictly a relay, if you have done, completed your 180 degree roll, will you try your high gain for Houston? Over.
CHARLIE BROWN Houston, Charlie Brown, I am on high gain.
CC Roger, Charlie Brown. We read you. How are you doing?
CHARLIE BROWN Houston, Charlie Brown. High gain antenna.
CC Roger, Charlie Brown, Houston. We are reading you 5 by.
CC Hello, Snoop, Houston. If you use any different F stops on the film, we'd like for you to mark it so we can process it right. Over.
SNOOPY That ought to be a ball.
CC Right.
SNOOPY I'll try Charlie. I'll do my best.
CC Okay, Gene-O, I was just asked. Don't worry about it. Sorry.
SNOOPY Don't be sorry. Hey, you guys are floating on the world out there sideways.
CC Okay.
SNOOPY As the earth came up, on this earth day, I guess you would call it, the north pole was to the right and the south pole was to the left and it looks like -- see a lot of clouds over the Pacific Ocean. We were kind of busy and didn't take much time to notice, but it was a beautiful sight. Over.
CC Roger. We're here and still spinning.
SNOOPY Okay.
SNOOPY Charlie, I don't know how the big man must be seeing it, but if his view is any better than ours, it has got to be fantastic.
CC Copy.

CHARLIE BROWN Houston, Charlie Brown. I'd like to get a sunset time. Over.

CC Roger, Charlie Brown. Stand by.

CHARLIE BROWN Oh, never mind. It happens so fast around here, I ought to be instantaneously aware of it.

CC Charlie Brown, Houston. We've got a time for you for sunset. 104 and 58. Over.

END OF TAPE

CAPCOM - zero 4 and 58, over.
SNOOPY 10458, over.
CAPCOM Affirm.
SNOOPY Roger.
CHARLIE BROWN I show you at 64.89 miles. How do you agree with that, Snoop? 64.7.
SNOOPY Roger. You're right on the money. We show you about 64.6 now.
CHARLIE BROWN Roger.
SNOOPY We're correlated right down there. That VHF is working beautiful. Just like the radar. That's mighty good gear. Sure seems to be. Hey Houston, Snoopy.
CAPCOM Go ahead, Snoop.
SNOOPY Okay, for the record we have been operating with Charlie Brown the whole time while he's been on VHF ranging 9VF PTP and our hot mike apparently does not bother John at all and we've had such good luck S-band with you folks down there that we've had hot mike very short period of time.
CAPCOM We copy all that. Thanks a bunch.
SNOOPY That S-band antenna makes noise but it sure does track.
CAPCOM Okay.
CHARLIE BROWN Rog, I see you. Very good.
SNOOPY Okay Houston, this is Snoopy. We're at 60 nautical miles closing and hard dock outlook looks real fine. I'm sure you're reading it down there. Everything looks real good from here and I still don't have his flashing light from this distance of 60 miles, over.
CAPCOM Roger, Tom. We copy. We got you plotting right down the line on your charts, over.
SNOOPY Well roger. Thank you, Charlie. It's looking good here.
CHARLIE BROWN Okay, they're on. I'll turn on these running lights and EVA lights too, Tom. Maybe you can - help see them when you get closer.
SNOOPY Okay.
PAO Hard dot is the range rate. We show that as 120 feet per second and closing.
CHARLIE BROWN Snoopy, you got a lighter EPI time.
SNOOPY Roger. Hello Houston, this is Snoopy. The AGS comes out with the TPI at an angle of 26.51. Of 24.4 to initiate and 55.9 to total and that time is just about the same time I'm looking at right now of 105:23:20.
CAPCOM We copy, Snoop. Thank you much.
SNOOPY John, our new TPI time is 105:23:06:01 105:23:06:01.

CHARLIE BROWN Roger, I got it.
SNOOPY That's only moved up towards us about 12 seconds. Okay, John. Coming up on 52 say .3 miles or so. I still don't have you in sight. No problem, we're locked on solid.

END OF TAPE

CHARLIE BROWN Did you get your final PPI time over?

SNOOPY Stand by.

SNOOPY Go ahead.

SNOOPY John. No. We're not going to push final comm until 12 minutes but the latest one we got is what I just gave you.

CHARLIE BROWN Okay. That will be fine.

SNOOPY Is that conversion with you.

CHARLIE BROWN AH. That thing is still calculating. It really takes a while.

SNOOPY Charlie Brown. we suddenly feel this last weak cycle through 6 feet per second out of place.

CHARLIE BROWN Roger. Wait a second.

SNOOPY Hello Houston. Do you have somebody that can read our eraserable, check our radar angle biases. Over.

CC Roger. Stand by.

SNOOPY My ITPI time, this later, is 1052316,79, How is that for good correlation?

CC Snoopy, Houston. Your radar bias is in the NOISE. Over.

SNOOPY Okay. Real fine Charlie. Thank You very much.

CC Roger.

CC And Charlie Brown, Houston. Over.

CHARLIE BROWN Go ahead. Over.

CC Roger. If you get a chance, we'd like you to bring your logics up so you can dock anytime. And we can give you a go for the arm and also if you get a chance to cycle through the tunnel vent valve on the LM press.

CHARLIE BROWN No. Negative. Not yet.

SNOOPY Okay. You want the 6 logic breakers are coming on and the spiral A&B batteries breakers are going in.

CC Charlie Brown to Houston. You're GO for power arm at your convenience. Over.

CHARLIE BROWN Roger. Thank you.

SNOOPY Charlie Brown, Snoop. When you get your solution we're interested in the out of plane part so call it down to us would you?

CHARLIE BROWN Yes sir.

CHARLIE BROWN My NOUN is 81 minus 21.8 plus 4 and one half and plus 10.4.

CHARLIE BROWN Plus 4 and one half.

SNOOPY Yeah. For a change.

CHARLIE BROWN Roger.

SNOOPY Houston our ITPI time is 105225619.

CC Roger. Copy.

CHARLIE BROWN Why don't you give me an LOS time and an AOS while you've got it. While we have a chance.

CC — Roger, Snoop. LOS is 10532. AOS 10619. Over.

SNOOPY — I got them. Thank you.

CC — Rog. and Charlie Brown your LOS is about the same. Your LOS is about the same Charlie Brown and AOS also. Over.

CHARLIE BROWN — Roger. I missed those.

CC — Okay, LOS -

SNOOPY — 10532 and 10619.

CHARLIE BROWN — Okay, I'll get them for you later.

SNOOPY — Okay Charlie Brown, this is Snoopy. I'm finally starting to see your flashing light, very faintly at 42 miles, very faintly.

CHARLIE BROWN — Roger, 41.7 isn't it.

SNOOPY — Yeah.

SNOOPY — Charlie Brown, this is Snoopy. We're burning your out of plane here my noun 81 for you that we're going to burn.

CHARLIE BROWN — Go.

SNOOPY — Plus 21.7, minus 4.5 and minus 9.6.

CHARLIE BROWN — Roger.

SNOOPY — Okay Charlie Brown, this is Snoopy, we're pitching down to put our X axis towards you for the auto maneuver from DPI.

CHARLIE BROWN — Roger.

PAO — Range is 39 miles.

SNOOPY — Okay we're at burn attitude, Charlie Brown.

CHARLIE BROWN — Roger, almost me too.

SNOOPY — How about that.

PAO — This will be another reaction control system burn but the propellant will be fed from the ascent mode -

END OF TAPE

PAO - reaction control system burn but the propellant will be fed from the ascent propulsion system tanks through the innerconnect.

SNOOPY 2 minutes to the burn.

CHARLIE BROWN Roger.

SNOOPY And Charlie Brown, our charts agree very closely so we're go.

CHARLIE BROWN Roger, my numbers agree with your numbers. Then I guess we're all in agreement then let's go. 119 to the burn.

SNOOPY Roger.

CHARLIE BROWN Mark, one minute to the burn.

SNOOPY Roger.

CHARLIE BROWN 35 seconds, DSKY blank.

SNOOPY How many seconds, John?

CHARLIE BROWN 5, 4, 3, 2, 1, burning.

SNOOPY We're burning.

CHARLIE BROWN Go to it.

CAPCOM We copy.

SNOOPY We got 15 to go.

CHARLIE BROWN Right.

SNOOPY Burns complete.

CHARLIE BROWN Roger, good show.

CAPCOM Snoop, Houston. We see you trimming. Good show.

SNOOPY Okay, zero 1 and 1 tenth.

CAPCOM We copy, Snoop.

SNOOPY And Snoopy's pitching back up to acquire. Houston, this is Snoop. You can't believe how noisy those thrusters are.

CAPCOM Roger, 10. We can't even imagine.

SNOOPY It sounds like being inside a big rain tub with about 2 inch hale beating all over you.

CHARLIE BROWN Hey, babe. Here's where ... -

SNOOPY Okay, I'm pitching up to give you radar target here. Garbled.

PAO And Snoopy's now on an intercept trajectory to Charlie Brown. And he burned his own solution which agreed very closely within a few tenths with the ground solution. He burned delta V of 24.1 feet per second at 105 hours, 22 minutes, 56 seconds.

SNOOPY Okay Houston, this is Snoopy. We have solid lock and first update appear real good.

CAPCOM Roger, Snoop. We copy. We got 4 minutes 50 mark to LOS for you, over.

SNOOPY Roger.

PAO Range 26 miles.

PAO Range rate 125 per second.
SNOOPY Houston, Snoop. I'm taking you off the high gain.
CAPCOM Okay, Roger. You're reading my mind.
SNOOPY GARBLED
CHARLIE BROWN I can hear (garbled)
SNOOPY Garbled - VHF, I think. Garbled. God damned, that one looked like it was coming inside.

END OF TAPE

SNOOPY (garbled)
CHARLIE Say again. (garbled) flashing it off.
SNOOPY Charlie went (garbled)
CHARLIE Yeah.
CHARLIE Okay, how are you doing?
SNOOPY Perfect, it's right on them.
CHARLIE Right on them?
SNOOPY Yeah.
PAO And this is Apollo Control at 105 hours, 32 minutes. Both Charlie Brown and Snoopy have gone behind the moon, and we have loss of signal. When we next see them, they should be station keeping. Getting ready to dock. We're showing the command module, command service module, Charlie Brown, in a 63 37 nautical mile orbit, and Snoopy is on an intercept trajectory. Snoopy performed 2 good burns during the time we had acquisition, the constant delta height maneuver at which time we had a constant delta height following that maneuver 14.94 nautical miles, and then the terminal phase itself completed just a short time ago. The - there are two midcourse corrections programmed if needed. The nominal DELTA-V is zero in both of those, and Charlie Duke just remarked that just before Snoopy went around the corner he heard Tom Stafford say they were just taken a mark, and they were right on. So they may or may not do either of those midcourses. And then the terminal phase is finalization. The breaking maneuvers will be performed behind the moon, and at acquisition time, they should be station keeping within a few feet of each other. Acquisition for the Charlie Brown, 106 hours 18 minutes, 39 seconds, for Snoopy 106 hours, 18 minutes, 55 seconds. This is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 106 hours, 18 minutes into the mission. We're about a minute away from acquisition of Charlie Brown. Snoopy acquisition to come 15, 16 seconds after that of Charlie Brown. The two spacecraft should be station keeping as we acquire them. On the sixteenth revolution here, we have the capability on both this revolution number 16 and on revolution number 17 to receive television. Television is scheduled for the 17 revolution during the ascent propulsion system burn depletion. However, the capability does exist to receive it, and it's possible we might have an unscheduled transmission. We're not sure. We should have AOS now on Charlie Brown any second.

SNOOPY Okay, you ready to dock?

CAPCOM Snoopy, this is Houston. How do you read me?

SNOOPY Looks like it's good.

SNOOPY Hey, Joe. We're about ready to dock. Stand by.

CAPCOM Very good.

SNOOPY Don't call us. We'll call you.

CAPCOM Roger, out.

SNOOPY Okay, John. You're in to about 5 feet. Looking beautiful.

CHARLIE How far?

CHARLIE 20.

SNOOPY I captured?

CHARLIE Yes, you are on.

SNOOPY I got capture, John. Fire when you're ready.

CHARLIE Everything looks good here, Tom.

SNOOPY Okay, here Oh, we look good.

CHARLIE Yell when there's a rock in the cabin, babe.

SNOOPY All right, babe. I can see you moving over. ...

SNOOPY Oh, we got that one, all.

SNOOPY We got them, John. We heard them in there.

SNOOPY Yep. Hello Houston, Snoopy and Charlie Brown are hugging each other.

CAPCOM Roger. We heard them down here.

SNOOPY Okay, let's stay - let's stay in our helmets, babe, until we get this thing squared away.

SNOPPY Okay, John. That was beautiful. Just beautiful, babe. Okay now John. Let me ask you one thing. Do you want me to pressurize that LM tunnel (garbled) so you can blow that mylar out again? Okay, do you want us to pressurize the tunnel? Okay.

SNOOPY And we is back home. Almost.
SNOOPY Okay.
CHARLIE Okay, I'll get started, and you can turn the (garbled) the hatch.
SNOOPY Houston, were you calling?
CAPCOM Negative, Gene. We're standing by until you got some time.
SNOOPY Okay, Joe. It's nominal that the rendezvous was the best one we've ever had. Right up the pad all the way. We'll talk about it later. I'm going start going through the tail end of the acquisition check list for the APS burn, and I'm pretty sure that Tom and John will start on the tunnel.
CAPCOM Roger. Snoopy, this is Houston. One thing we would like for you to do is go to secondary on the CO2 canister. We'd like to monitor that one while you're getting cleaned up there.
SNOPPY You're right, Jose. It's been a long day.
SNOPPY Say again, Joe.
CAPCOM Roger, Gene. We'd like for you to go to secondary on CO2 canister. We want to monitor that canister while you're getting cleaned up and back in the Command Module.
SNOOPY Yeah.
SNOOPY Hang on Joe. I can't - wait a minute.
SNOOPY Okay, Houston. Now say again you last.
CAPCOM Roger. Go secondary on CO2 canister.
SNOOPY Okay, we're secondary on CO2 canister now.
CAPCOM Roger. Thank you.
SNOOPY Okay, John. How do you want to work the tunnel? Do you want to pressurize it or do you want me to? Okay, we got plenty of pressure. Okay, that's better. Okay, go ahead. You pressurize it.
SNOOPY Hello, Houston, this is Snoopy. One thing, Charlie Brown is getting ready to pressurize the tunnel, and we want to make sure we're in the right attitude and everything for the next maneuver ..., but the next thing that he needs to know are the angles. Over.
CAPCOM Okay, we'll get them for you, Snoopy. Okay, Charlie Brown, Snoopy, this is Houston. Your CSM gimbal angles are roll 300 pitch 071 and yaw 000. We're standing by for your readback.
SNOOPY Okay, I got those for Charlie Brown. Roll 300 pitch 071 and yaw 000.
CAPCOM Roger, that.

SNOOPY We have an update on a LM weight.
CAPCOM Charlie Brown, this is Houston. No, Snoopy, this is Houston.
SNOOPY Go ahead, do you have an update on the LM weight?
CAPCOM I've got that through, Geno, but we want you to load in adapt 10011 for system A.
SNOOPY You want 10 - say again what you want.
CAPCOM Okay, I want 10011. That'll be system A. That's in for your adapt, and also your LM weight for burn is 7 - 07544.

END OF TAPE

SNOOPY Roger. LM weight is 7544. That's what I thought. I didn't enter that.
SNOOPY Hey, Joe, give me that once more and I'll get it straight.
CC Okay, Gino. Your LM weight is 7544 and in your DAP we want 10011. This is instead of 11011. Very good. we copy, Gene.
SNOOPY Tom, is your stop button reset auto over there. I am going to wait on a couple of these things while I verify that tunnel is clear.
CC Snoopy, this is Houston.
SNOOPY Charlie Brown, Snoop, let me know go ahead.
CC Roger, Snoopy, whenever you are ready, we can uplink your LM state vector to you.
SNOOPY Okay, we're ready right now. As soon as I get into POO again.
CC Okay. Thank you.
SNOOPY Charlie Brown, this is Snoopy again. Let me know how the tunnel is coming.

CHARLIE BROWN Let me get my gloves off, Babe.
SNOOPY Good show. Tunnel all --- tunnel all pressurized and everything looks good. Okay.
SNOOPY Okay.
CHARLIE BROWN (Garbled) Do you remember? asked X for these?
SNOOPY Look Joe, we haven't moved at all. Okay, and Gene got the angles for that auto maneuver.
CHARLIE BROWN Yes, most all of it is.
SNOOPY Ours is the bag that I brought my helmet over in.
CAPCOM Snoopy, this is Houston. The computer is yours when you want it. Now we've got the load in.
SNOOPY Okay, roger, thank you.
CAPCOM And are you fellows in the transfer mode right now?
SNOOPY Just about.
CAPCOM Okay, I've got some pads for you ---
SNOOPY Have not opened the hatch yet.
CAPCOM Okay, I've got some pads for you, Gene, whenever you're ready to copy and give me a call when you're ready.
SNOOPY Okay Joe, I'll call you when I'm ready.
CAPCOM Roger that, and you're aware of where your tool kit is. Is that affirm?
SNOOPY Yes, affirm.
CHARLIE BROWN Okay, do you have a LM Delta-V there?
CHARLIE BROWN Okay Joe, we're going to open the hatch.
CAPCOM Roger Tom.

END OF TAPE

CAPCOM Snoopy, this is Houston, we have 3 additional items that we want brought back. We want both the cameras brought back and would you believe, we also want the primary canister brought back, the primary lithium hydroxide canister brought back from the LM, over.

SNOOPY Where do you plan for us to stow that, Houston?

CAPCOM Roger, we kindof anticipated that, and we're thinking about that right now. Make that the last item you transfer back, Tom.

SNOOPY ...

CAPCOM Snoopy, this is Houston. We'd like to go to a forward omni on the high gain antenna we're just about against the stop now.

SNOOPY ..... omni.

CAPCOM Okay, thank you alot, Geno.

SNOOPY Hello Houston, go ahead and give me the update, would you please.

CAPCOM Roger that Geno. Coming to you with Aps depletion burn. Okay for noun 33 108 50 3100 +45576 +5 balls -06231 46000 407 3 balls 251 +45981 -5 balls +01339 and all else is NA, I'm standing by for your read back.

SNOOPY Okay, Joe aps burn depletion is 108 503100 +45576 +all balls -06231 46000 407, by the way, who's going to be in here to watch the burn time. Roll is all zero, pitch is 251 986 +45981 is - all balls and +01339 and the coamps are is NA.

CAPCOM Roger that, I've got 1 more change for you Gene, in your check list under activation 69, just prior to step 5 we want you to load in 404 +all zeros.

SNOOPY Will do.

SNOOPY Charlie does the dap and everything look good to you right now? I won't go through that again.

CAPCOM Snoopy, this is Houston. Were you calling?

SNOOPY Yea, does the dap look good to you right now. I won't go through that again right at the moment. I'm starting over and running through this real quick.

CAPCOM Roger, that's good.

END OF TAPE

SNOOPY Roger, that's good.
CAPCOM And Snoopy, this is Houston. On this LIOH canister, looks like under the left-hand couch in the sleeping bag is going to be the best place to stow that. And we really would like to have it come back. We got rise in CO2 in the LM and we'd like to take a look at that can.
SNOOPY Okay, I'll try and get it out. You don't want a new one in, do you?
CAPCOM Negative that.
PAO This is Apollo Control. We've completed our shift change in Mission Control. Flight Director, Milton Wendler has relieved flight director, Glynn Lunney. We anticipate the change of shift briefing will begin in about 15 minutes at about 11 pm Central Daylight Time.
CHARLIE BROWN This is Charlie Brown, Houston.
SNOOPY What do you want, John. I'm up to my earballs, here.
CHARLIE BROWN Hey, (garbled).
SNOOPY What John?
CHARLIE BROWN (Garlbed)
SNOOPY I don't know, babe. I - wait a minute.
PAO (Garbled)
SNOOPY Now who's calling? Houston, are you calling me?
CAPCOM Negative, Snoopy. We're just standing by.
SNOOPY (Garbled) Hey John, are you in burn attitude?
CHARLIE BROWN (Garbled) burn attitude. (Garbled) Houston, Charlie Brown. Over.
CAPCOM Charlie Brown, this is Houston. Go ahead.
CHARLIE BROWN (Garbled) in burn attitude. Over.
CAPCOM Stand by. I'll find out.
CHARLIE BROWN (Garbled)
CAPCOM Charlie Brown, this is Houston. That's affirmative on tight deadband.
CHARLIE BROWN Negative though?
CAPCOM That's affirmative for Charlie Brown. Tight deadband on your burn.
CHARLIE BROWN (Garbled) tight deadband (garbled)
CAPCOM Charlie Brown, this is Houston. I'm sorry, John, you're cutting out pretty bad. If you could understand we will want you in tight deadband and if there's anything else, would you relay it through Snoopy?
CHARLIE BROWN Roger.

END OF TAPE

CHARLIE BROWN Hey Joe, I'm down to the point where I've configured the S-band, so if I've missed anything, you got high bit rate let me know. The only thing I haven't done is turn the voice off to you.

CC Okay Snoopy, one thing that we'll want now is the settings on your control knob there for your high gain for pitch and yaw.

SNOOPY Okay, I'm looking at about 182 and about minus ...

CHARLIE BROWN Houston, Charlie Brown, how do you read?

CC Charlie Brown, this is Houston, go ahead.

CHARLIE BROWN Roger. While we're waiting for this thing to separate from it, (Garble) deadband or is 5 degrees okay.

CC Negative, Charlie Brown. We want no daps deadband and we want you to configure your DAP for your checklist. Over.

CHARLIE BROWN Roger.

CC And Snoopy, this is Houston, we copied 182, what was the yaw setting on that control knob?

SNOOPY Yaw setting is minus 5 and I'm going through the DISKY slow, so if you see something, tell me.

CC Okay, we'll monitor, thank you.

SNOOPY You mean the checklist in the flight plan there, Joe?

CC That's affirm.

SNOOPY Man, with those numbers in there, I'm not so - I'm glad I'm getting out.

CC (Laughter) Roger.

SNOOPY And just for the record, Joe, you're a fink.

CC Copy - fink.

CHARLIE BROWN Okay Joe, the checklist I got shows for the active docking, you have 6112.

CC That's affirmative John.

CHARLIE BROWN Why deadband.

CC Okay, stand by, I'll check that out, John.

CHARLIE BROWN And this morning they told me that AC roll - they wanted to use it, and this afternoon, okay.

SNOOPY This thing caused me to check your timer John but we're well over an hour away, so forget about it.

SNOOPY Houston, on step 4 on activation 69 where I proceed, do I have to do anything with that 4 balls 2?

CC That's a negative, Snoopy.

CHARLIE BROWN Okay now what'd you want me to put there for the LM weight there, Joe.

CC Okay, I'm getting that, Charlie Brown.

CC Okay Charlie Brown, this is Houston.

CHARLIE BROWN I just want to express a heart-felt thanks.

CC Charlie Brown, this is Houston. For your LM weight we want to set in 07544 and John, we're satisfied with your 61112 setup.

CHARLIE BROWN Okay, samples stay the same cause we're going to get rid of that thing.

CC That's affirm.

SNOOPY Joe, 267 out of the AGS reads 4600.

CC Roger, copy 4600, that looks good, and Snoopy it looks like you're going to have to slew from MAX signal again, and we'll need those knobs - control knobs settings after you do it.

SNOOPY Alright.

CHARLIE BROWN Houston, this is Charlie Brown.

CC Go ahead Charlie Brown, Houston.

CHARLIE BROWN Roger, I just wanted to say I sure do thank everybody that worked on the probe and made it work the way it did.

CC Roger, we already copied that, John.

CHARLIE BROWN Sure is a - sure worked good.

CC That's what we'd like to hear.

CHARLIE BROWN Can't tell you how pleased I am.

CC Now will you autograph a picture for me?

CHARLIE BROWN Of the probe, yeah.

SNOOPY Joe, you're a fink, I told you.

CHARLIE BROWN The fink sure has sent a man out to do a boy's job though.

CC Roger that.

SNOOPY Hey Joe there's slew for a MAX signal. I brought it up a little bit but all I did was move the numbers and they're reading the same thing, 182 and minus 5.

CC Okay, we copy, Gene. 182 and minus 5. And, as you're coming through the tunnel you might take a look at the docking angle there and see how close it is.

SNOOPY Make that 182 and minus 10.

CC Roger, 182 and minus 10.
CC Charlie Brown, Houston.
CHARLIE BROWN Go ahead, over.
CC Roger John, we got our tail between our legs here. We'll need for you to load in your DAP 61102, and you get an atta boy for that.
CHARLIE BROWN Alrighty.
CC And Snoopy, once he gets that set up, in the narrow deadband, I'm afraid we're going to have to ask you to slew from MAX signal again.

END OF TAPE

CAPCOM Snoopy, Houston.
SNOOPY Go ahead, over.
CAPCOM Snoopy, we were monitering your activation 69, the last 2 steps, we'd like for you to verify that you've put 616 through zeros and 411 to +1. Snoopy, this is Houston. What we copied down here on the last step was a 611 instead of 411.
SNOOPY Yea I put 411, I'll check it for you.
CAPCOM Okay, thank you Gene-O.
SNOOPY There you go. Okay.
CAPCOM Okay, Snoopy we got it. Thank you very much, and we'll need no ascent feed on this, Snoop.
SNOOPY Okydoke. I only forgot the PG instrument chart 1 time when I went to update, how's that?
CAPCOM That's better than the average bear.
CAPCOM Snoopy, Houston.
SNOOPY Go ahead, Joe.
CAPCOM Okay, Gene-O, referring back to activation 64 on step 2 we'd like pressure A and B to egress, please.
SNOOPY Thank you sir. That one happened in a big fast run.
CAPCOM You bet you. Copy that, thank you very much Gene-O.
CAPCOM And Charlie Brown, this is Houston. I've got a maneuver pad for you, John, when you're ready to copy.
CB Have a what sir?
CAPCOM I have a maneuver pad, PEI 22.
CB Rog, wait one.
CAPCOM Roger, let me know when you're ready.
CB What's your LOS time, Joe?
CAPCOM Say again please.
CB Joe, that's about as high as I can tweek those things and it's 182 and -5.
CAPCOM Okay I copy, 182 and -5 and our LOS time is 107:31, we've got about 13 minutes yet.
CB Okay, now you're going to give me a TEI pad, huh?
CAPCOM If you're ready to copy, John.
CB Go to it.
CAPCOM Roger that. SPS V&N coming up. Okay you're now 47 3 7 1 0 0. -060 +079 119 41 2885 +29472 +00558 -00165 NA 071 all else is NA and stand by for the read back Charlie.
SNOOPY Okay what is the zero sep 1, the pitch angle.
CAPCOM That's pitch angle, and before you read it back, Snoopy, I'd like for you to check on this activation 69, 616 to all balls and 411 to +1, those are the last 2 steps.

SNOOPY Say again.
CAPCOM Okay, Snoopy, this is Houston, do you copy?
SNOOPY Yea I copy, but I didn't hear what you said.
CAPCOM Okay, we need for you to go 616 to all zeros. This is still in activation 69 this is the last 2 steps, 616 to all zeros and 411 to +1.
SNOOPY Dave, I just read it out and it is all zeros.
CAPCOM Okay, thank you much.
SNOOPY I'll do it again.
CAPCOM Okay, we'll appreciate it if you'll give it 1 more try.
SNOOPY That's what I'm doing. I'm reading in address 500 158.2, it bounces around 142.2 134.3.
CAPCOM Okay, those sound good Snoopy. And Snoopy, Charlie Brown this is Houston, we've got about 10 more minutes until LOS and Charlie Brown when you're ready to read back, I'm standing by for your read back on that maneuver pad.
CB Roger, SPS D&N 37100 -060 +079 119 41 2885 +294 7 2 plus 2 balls 558 -2 ball 165 pitch 071.
CAPCOM Read back is correct, John.

END OF TAPE

CAPCOM Hello Snoopy, this is Houston.
Hello Snoopy, Houston.
SNOOPY Go ahead.
CAPCOM Rog, Snoopy, we keep loosing signal. this high gain antenna. What I'd like for you to do Geno, just before you leave the LM, I'd like for you to slough a max signal again and give us those settings 1 more time. We keep droping a signal out and rather than going back and trying to slough it just before you get ready to leave, slough it up again to max signal if you would.
SNOOPY When are you going to have the debriefing on this one, Joe?
CAPCOM Glen said in a couple of days. How soon can you guys be ready?
SNOOPY That's the first ..... That's the first nominal run we ever had. You should see those NEP's they have up here.
CB Hey, Houston have you been watching this package A temperature? We never have got it to go down much all day.
CAPCOM We'll be with you on that, just a minute there Charlie Brown.
CB Okay, I guess we've gone this long. We can go another week or so. Snoopy wants to know if he should go into V42, over.
CAPCOM Say again, Charlie Brown, I missed part of that.
CB Snoopy would like to know if he should go into V42, over.
CAPCOM Okay, stand by, I'll find out.
CAPCOM Charlie Brown, this is Houston. Negative Snoopy leave it in 2.
SNOOPY Okay just let me verrify my guidance control switches for you, okay.
CAPCOM Roger, go.
SNOOPY Okay guidance control is ping AGS S-band is max, attitude control is mode control on roll pitch and yaw and mode control switches both pings and ags are in auto. Is that correct.
CAPCOM That's correct, Snoopy, you got them all right.
SNOOPY And you wanted the dsky left in poo.
CAPCOM That's affirmative. Leave her in poo.
SNOOPY And the up data link switch is on.
CAPCOM Okay, we copy, and did you copy, we want you to slough that S-band for max signal one more time and give us a reading just before you leave.

SNOOPY Okay, I've got one more sigma stowed here and then I'll do it. How much time have I got you yet?

CAPCOM Okay, we've got about 2 minutes and 30 seconds till LOS.

SNOOPY Let me do it now and I'll take the canister on my way out. Let me slough this thing.

CAPCOM That sounds great Geno.

SNOOPY Hey, Joe, would you believe I've got all the circuit breakers pulled, and I can't tell. I don't know where max signal stregnth is anymore, let me see.

CAPCOM Okay, that's good right there, Geno. The way you've got it. Snoopy, Houston telcom says you got her right there, that's a good shot in the blind.

SNOOPY Okay, same numbers I gave you before I'm going off the air.

CAPCOM Roger that see you back in Charlie Brown. Good show Geno.

PAO And we've had loss of signal. We'll reacquire Apollo 10 in about 46 minutes as the spacecraft comes back around the, onto the front side of the moon, on its 17 revolution, and during that revolution we'll have the aps burn to depletion and we also have television scheduled, which we hope will give us good coverage of that LM ascent stage maneuver. The change of shift briefing, we now estimate will be in about 10 minutes. The participants will be leaving shortly. At 107 hours 31 minutes this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 108 hours 16 minutes into the flight of Apollo 10. We are now about 50 seconds from reacquiring the spacecraft, now in its seventeenth revolution of the moon. We expect when next we hear from the crew that Tom Stafford and Gene Cernan will be back in the LM, rather back in the command module. We'll shortly after acquisition, be scheduled to separate the LM followed by the unmanned ascent stage burn to depletion, and we hope to have television coverage of that event. Coming up on 15 seconds now to acquisiton of signal. We'll be standing by for that.

PAO LM telcom reports that we have good signal strength on the high gain antenna.

CHARLIE BROWN This is Charlie Brown.

CAPCOM Charlie Brown, this is Houston. We read you loud and clear. How are things going?

CHARLIE BROWN Well, we're all back in the command module, the tunnel's all locked up, and we're in attitude, and standing by to sep here when you give us the word.

CAPCOM Okay, we're looking good for sep here, now, Tom.

CHARLIE BROWN Okay Joe, now again that tunnel won't fit, so what we've done is pumped our cabin pressure up about 4PST above and (garbled) and we're holding real good.

CAPCOM Roger, I understand, Tom.

CHARLIE BROWN Okay, now, what attitude do you wish us to go to when we - after we separate. Over.

CAPCOM Okay. Charlie Brown, stand by just 1. I'll get you that.

CAPCOM Charlie Brown, this is Houston. We'll get you some gimbal angles for that attitude after SEP. In the meantime, we'd like for you to on your cryo H2 heaters,. On tank 1, go to AUTO; and on tank 2, go to OFF, please.

CHARLIE BROWN Roger, now do we have a go for pyro alarm, here?

CAPCOM Okay, Charlie Brown, this is Houston. We're standing by for logic. We'll give you a go on the pyro alarm here in just a minute.

CHARLIE BROWN I got the logic off. You want me to turn it on?

CAPCOM Roger, Charlie Brown. Go ahead and turn it on.

CHARLIE BROWN I tell you (garbled) Okay.

CAPCOM Okay, Charlie Brown. This is Houston. We got your switches on now.

CHARLIE BROWN Roger.

CAPCOM Charlie Brown, this is Houston. Your gimbal angles for attitude after SEP are roll 180, pitch 252, and yaw, 3 balls.

CHARLIE BROWN Roger. Roll 180, pitch 252, and yaw is all balls.

CAPCOM That's affirm.

CHARLIE BROWN And when do you want us to separate Joe?

CAPCOM Okay, we want - we can go ahead and separate now, Charlie Brown.

CHARLIE BROWN Okay.

CHARLIE BROWN Okay, Houston. We'll give you a countdown. We're all set to go for SEP. Right?

CAPCOM That's affirmative, Charlie Brown. We're standing by for your count.

CHARLIE BROWN Okay. Give you a 5 count. 4, 3, 2, 1, fire.

CHARLIE BROWN Cabin pressure's holding. Snoop went (garbled).

END OF TAPE

CB Houston, Charlie Brown, over.
CAPCOM Roger, Charlie Brown, go.
CB Man when he leaves, he leaves.
CAPCOM Yea okay don't back into that dude now John when you get turned around. Are you keeping it in sight?
CB Yea, okay. Joe, he took off so fast he's gone he went right into the sun.
CAPCOM Roger, copy.
CB We don't have any idea where he went. He just went boom and disappeared right into the sun. If you give us gimball angles and allow us to burn out of here, we'll be okay.
CAPCOM Okay, stand by.
CB Hello, Houston, Charlie Brown.
CAPCOM Roger, Charlie Brown, go ahead.
CB Okay, look let's take a quick look at these orbital mechanics. When we seperated orb rate, he was straight up and he had that 5PSI on the tunnel and he took off like a scalded rock straight up, okay.
CAPCOM Roger that.
CB Now if we go to this attitude do you want us to, okay now when we go to this attitude we're going to be looking down when were vertical. Alright.
CAPCOM Roger.
CB Now he's up above us some place. I don't know where. Now do you want us to thrust down?
CAPCOM Okay, stand by Charlie Brown. We're running this thing through right now.
CB Yea because we don't want to see Snoopy come back here with a full head of steam.
CB It's not nothing you have to make an immediate decision about
CB You've got plenty of time.
CAPCOM Charlie Brown, this is Snoopy. Charlie Brown this is Houston.
CB Yea, I hope this is Houston. We're going to try to pick Snoop up on our VHF ranging but go ahead.
CAPCOM Okay, you didn't leave anybody in there did you Tom?
CB No, I don't think so.
CAPCOM Okay, this is Houston again. Tom, what we want you to do is to in the attitude that you're going to now, this attitude we passed up to you we want you to burn +X instead of -X and this should give you seperation based on this velocity, which we think is due to that pressure in the tunnel, and also we want you to enable bravo 3 and Charlie 4 jets.
CB Okay Bravo 3 and Charlie 4, okay now this is what I thought too when we seperated that attitude Snoop took off in a vertical climb like mad so we're going down

CB and out in front of him so if we go down in thrust +X will take us down even further out in front over. Does your fido agree with that?

CAPCOM I think they do Tom, they are kind of scratching their heads right now. Roger on that and the reason that Snoopy took off, we're showing that he vented out all the pressure out of the cabin. We think it vented out through the tunnel and that probably gave him some delta-v.

CB We had the hatch valve in auto, set right and everything. Everything was squared away, for Snoop.

CAPCOM rog, we may have some problem with some of that stuff sticking in valve -

CB Well I would believe that. It was like a snow storm when Snoop started off. You wouldn't believe it.

CAPCOM I bet that's right.

SNOOPY And it was right into the sun babe, right into the sun. How soon do you want to do this burn?

CAPCOM We want to sit tight here for a little while. We got about another 20 minutes before we want to burn.

CAPCOM Charlie Brown, this is Houston. We are firming up all of these things on attitudes and burns for you, we want to make sure we've got everything right before we torch off Snoopy.

CB Yea, I think we'll be in good shape thrusting down, but that initial call out looks like we were trying to make another high site on him ... use minus x.

CB It's really impossible to hit him in the ... anyway.

CAPCOM Charlie Brown this is Houston.

CB Yes sir.

CAPCOM Roger, Charlie Brown while these troops out are getting all their numbers all confirmed here let me pass up some other data to you. We've got a new sleep attitude we want for you to go to. This is to cool quad A, and the attitude is roll 090 pitch 210 yaw 000. In that attitude we'd like to high gain antanna. Pitch to -5 yaw to 231.

CB Okay, just leave attitude at 0090 pitch 210 yaw 3 balls and high gain pitch -

END OF TAPE

CB Okay this sleep attitude is 0090 pitch 210, yaw 3 balls and high gain pitch minus 5 and yaw 231.

CC Roger, that's right Geno. In addition tonight we'd like a waste water dump, and we'd like it at your convenience, that can be anytime, down to 25 percent again.

SC Okay Joe, almost everything, including going to bed is going to be at our convenience before we get out of our suits and things.

CC Okay. And, did you happen to notice the docking angle when you came back through the tunnel, and also did you get that big old canister back onboard.

SC Yeah, Joe, we got the canister onboard and John greased it again, the roll angle was plus 1 tenth.

CC Okay, plus 1 tenth, that's pretty darn good.

SC You don't believe that do you, Joe?

CC I believe that John.

SC It's the guy, it's the guy that aligned it that made it that way.

CC I don't believe that John.

SC It's got a sliding scale in the tunnel, we put it anywhere - it's got a sliding scale in the tunnel, we put it anywhere we want to.

CC That I believe.

CC And Charlie Brown, this is Houston, in your configuration in your sleep configuration we want you to disable C and D quads with the auto RCS select, in the DAP we want you the fail C and D and select AC roll, and DAP.

CC And Charlie Brown, this is Houston. We want you to go ahead and initiate your plus X 2-foot per second in X now.

SC Rog.

SC Okay, I'll get that quad stuff back here after we do this Joe.

CC That will be fine.

SC Hello Houston -

CC Charlie Brown, this is Houston.

CC Charlie Brown.

SC Hang on just a minute. Go ahead over.

CC Okay, we want you to enable all quads, that will be five ones in your DAP.

SC Okay, we got 2.1 on plus X here. Read our DSKY, X is 2.1, Y is .1 and Z is minus .1. Over.

CC Okay Tom, we copy and verify on the -
SC And 1.9 on EMS
CC 1.9, roger.
SC And 1.9 on EMS
CC Charlie Brown, this is Houston, we show you separating and we'll keep you posted on countdown on the ignition. In the meantime I've got a map update to send to you and also some data for you photography when you're ready to copy.
SC Roger. Look, we're kind of bushed right now and we don't need anymore photography before ... over.
CC Okay.
SC Yeah, it's going to take us a couple of hours to get out of our suits and get all the spacecraft squared away and all the stowage squared away and we've had a long day, so we want - we got a lot of landmark tracking to do tomorrow, so we'd just like to call it quits. Over.
SC Yeah, we're still set up to do the continued CEVA, we've got the couches stowed and everything.
CC Roger, we concur on that. One item I want to sent up to you though, in case you start to charge batteries in the morning before we get in contact with you, we're going to start charging A instead of B, but we'll give you a call first thing; and when you wake up.
SC I'll wait to talk to you in the morning before I do that, uh?
CC That will be fine, Jim.
SC I wish they'd have -
SC And if anytime tonight if one or the other of those quads starts to heat up and we need to change the attitude, for crying out loud, call us and tell us.
CC Okay, we sure will, John.
SC Houston, this is Charlie Brown here. What's the analysis on that quad A, are we near the fracture mechanics limits. It looks like it may be starting to cool off a little bit on the gage and come down maybe to about 390 degrees. Could you give us a quick synopsis.
CC We sure will. Just a minute Tom, I'll get it.
SC Okay.
SC Hey Houston, this is Charlie Brown.
CC Go ahead, Charlie Brown.
SC I'm glad they don't put that days one on top of each other, I'll tell you that.
CC Boy, you guys had a real one today, but you sure did good work.
SC That's not a bad day's work for 4 and a quarter, is it? And those machines have been doing the work

they really were slick. Yeah, and we also had a lot of good help from you down on the ground and we sure appreciate it. I thought the total system and everything (garbled) system turned out real well and we stood some rough spots and some COMMs and a few other things but by and large the whole system filled it off. And it made us real happy, but needless to say we're a little bit tired tonight. Over.

CC Well, we can sure understand that Tom, and we're concurring everything you say.

SC Hey Joe, how about a super FIDO and a super GUIDO up here for that CSI burn.

CC Roger that.

PAO This is Mission Control -

SC This thing is really a slicky, boy. It knows right where it's going all the time. ... all those solutions were just - shoot, you could just flip a coin and have picked any of them.

PAO This is Apollo Control. Weire assuming, based on Tom Stafford's remark that the crew is quite tired, that we will not be getting the TV transmission that had been scheduled during the APS burn to depletion.

CC 29 temperature - package temperature on the ground here Tom, did you say you were reading 390?

SC Not the package temperature, the helium tank temperature.

CC Okay copy - helium tank.

CC Okay Charlie Brown, this is Houston. We've had ullage on the engines.

SC Where is it?

SC Okay, we got ignition on Snoopy, Charlie Brown.

SC Hey, I may see it out there, I'm not sure but I think I do. I do.

CC Very good.

SC I'll see if I can tell you when he burns out. That's a long burn though isn't it, 4 minutes.

CC Yeah, can you tell which way he's going.

SC Yeah. Dave, it's just fire to me, I think he's going up, but see I'm not right side up either but - He's going, Joe. As long as I can see the fire, I guess he's going the other way.

CC Roger. From down here he looks like he's doing real good Geno.

SC Hey Joe, would he be burning away from us, sort of like maybe his attitude is local horizontal or close to it?

CC Charlie Brown, this is Houston, that's affirmative. He should be going in that direction.

SC Yeah, and I got him out my right hand window here, he's getting smaller and he's still on fire. How much more burn time has he got.
CC Stand by and I'll find out.
SC Hey, he just went out. He just went out.
CC Okay, we got him still burning, Gene.
SC Maybe it's because the sun went down.
CC Yeah, ma be. We got him still burning Geno, and about 40 seconds burn time yet.
SC Okay, maybe I - that looked like him, maybe it wasn't.
CC Deke thinks, he thinks you may have turned around and probably burning back at you now.
SC I couldn't hear it.
SC I fixed those switches so he couldn't do that. I'm glad to see that he's burning, that I didn't screw up or something in there.
CC Roger.
SC John - John remembered now what I forgot in there - what I left in there, my helmet or something.
CC The way he took off it doesn't look like you left very much in there at all.
SC Man, we had PLSSs and probes and droques and all sorts of things on there. How far will you be able to track him?
CC Probably for several hours.
SC Did he really go into the sun?
CC Well, he's going in that general direction.
SC God, I feel sort of bad about that because he's a pretty nice guy, he treated us pretty well today.
CC Roger, that's affirm.
SC That's what I talk about using up a piece of hardware though ain't it.
CC Roger that.
PAO This is Apollo Control. We show that we achieved a velocity of about 3700 feet per second from that burn. The nominal burn time would have been around 3 minutes 34 seconds and we'll have some refinements to that later. In order to conclude the change of shift press conference that was in progress when this pass began, we will take the circuit down and record any subsequent communications with the spacecraft and play those back to you following the completion of the change of shift press conference. This is Apollo Control at 108 hours 58 minutes.

END OF TAPE

PAO This is Apollo Control at 109 hours and 11 minutes. We still have about 18 minutes prior to loss of signal with Apollo 10, and we're in communication with the spacecraft at the present time. We also have about 2 minutes of tape recorded conversation that was collected during the completion of the change of shift briefing. We'll pick up with the tape, and then continue to follow live conversation.

CAPCOM Okay, Charlie Brown, this is Houston, Snoopy did a real good job burning and we're still tracking him real good. Getting good data from him, and we're going to let you go ahead and start doing you pre sleep check list and I'll try to keep the calls to a minimum until just prior to LOS.

CB Roger, Joe, should we go to sleep attitude now? Is that okay, with you?

CAPCOM Stand by Charlie Brown, I'm trying to find out now.

CAPCOM Charlie Brown, roger Houston. You can go ahead and go into your sleep attitude any time you want to now.

CB Roger.

CAPCOM Apollo 10, Houston.

CB Go ahead, over.

CAPCOM Rog, that was a beautiful job today. If you do half that well tomorrow, we'll let you come home.

CB We can do better than that tomorrow.

CAPCOM Okay.

CB Thank you Duke, we'll probably be ready by then too.

CAPCOM Yea, get a good nights sleep, you can use it.

CB Actually like Tom said, there is a lot of people who did a good, and I'll tell you these vehicles, so far, that little Snoopy was a real winner.

CAPCOM We concure.

SC And big Charlie Brown is no slouch either.

CAPCOM Charlie Brown, this is Houston. I hate to bother you but if you'll give us a computer we'd like to update your state vector.

SC Roger. You want them in the middle of this maneuver or can you wait till we finish or not.

CAPCOM We can wait till you finish, John. I didn't notice you were maneuvering there.

SC Okay, I don't think - - Houston, Apollo 10, you have the computer. ... Apollo 10 ready.

CAPCOM Apollo 10, did you get it, roger.

SC I got it twice. That's an interesting point about the communications ... sometimes I was hearing myself speak and also Gene and Tom speak twice. I don't under stand all that.

CAPCOM I'm not so sure either John unless maybe we were getting some relay modes in there today and I think, yea that comm guys are nodding their heads yes, we were getting some relay modes where probably you were coming down to the ground and getting set back to yourself.

SC Oh.

CAPCOM Let me give you 1 instance, that I think I know happened, when Charlie was on and you weren't able to reach Snoopy and in order to read him Charlie would key his mike down here. What would happen is you would come down to the ground, you'd come down to us and back up to Snoopy, but you'd hear yourself coming back up with about a 3 second delay, and it probably sounded like a pretty good echo.

SC Okay, well I understand that. That's a good capability to have, to be able to ground relay like that.

CAPCOM And Charlie Brown, this is Houston, I guess when you have these little intermitten times when you were hearing yourself talk that probably was the result of this same configuration being brought up inadvertantly, when maybe you were trying to talk to Snoopy, and we didn't know it at the time and tried to make a transmission and were keyed just for a few seconds. We would do the same thing, you'd relay down here and back to yourself for a short period of time there. Charlie Brown this is Houston, we're through with the computer now, you can go back to block. It's all yours for the night.

PAO That brings us up to date with the tape recorded conversation. We'll continue to stand by for any further live communication with Apollo 10. We have about 12 minutes 30 seconds before the spacecraft goes behind the moon on this the 17 revolution.

SC Houston, Apollo 10, over.

CAPCOM Go ahead 10, Houston.

SC Rog, could you review this dap configuration one more time that you wanted to be in.

CAPCOM Okay, stand by I'll make sure I've got it right before I pass it up to you John.

SC Okay.

CAPCOM Charlie Brown, this is Houston.

SC Go ahead.

CAPCOM Okay, John, on your daps if you'll make R2 read 11100 then you'll have the dap in the right configuration.

SC Roger, outstanding.

CAPCOM And also, Charlie Brown, on your quad A, we're showing less than 100 degrees right now on the temperature, and going down so we feel that there's no problem on that over temperature, on that quad.

SC Okay.
CAPCOM Charlie Brown, this is Houston.
SC Go ahead, over.
CAPCOM Okay, I just wanted to hit you with a couple of things before you go around the corner. First off, it looks like you've got a real good tight cabin there, in case there is any doubt in your mind of the stuff being in the seal. What we're looking at right now, and kind of thinking about, and going to let you think about on this pass and then pick you up, if you're still awake when we come around AOS next time, we're thinking about giving you 4 more hours of sleep time tonight. Right now we're already down to 6 to 7 hours of sleep and we figured out with the long day today, it might be good to, if you want it to have a longer sleep period tonight, and what we do is eat into the rest period on down the line there. We've got about 2 revs there you know where we can eat into without any problem.
SC Yea, I think after today, tomorrow, just can't be hard. I'll tell you these pressure suits even in zero gravity are something else.
CAPCOM What was that in zero gravity you said, John?
SC I said these pressure suits are something else, even in zero gravity.
CAPCOM Roger, I can imagine that. Well listen, you won't be asleep before you come AOS next time will you?
SC I probably won't sleep at all tonight.
CAPCOM Well what I'm getting at is you can talk it over and see if you'd like to do that or if you want to now, we can go ahead and start building the flight plan around that, but if you want to do that, we can work on revising the flight plan while you're asleep tonight then.
SC Okay, let me talk it over with my compatriots here.
CAPCOM That'll be fine. No rush, we've got about 3 minutes and 45 seconds until AOS, until LOS, and we can catch you coming around the corner next time if you want.
SC Rog.
CAPCOM Okay, Charlie Brown, this is Houston we show about a minute and a half until LOS, and we'll expect to hear from you coming around on the other side, however we'll wait for a call from you.
SC Alright thank you.
CAPCOM Okay, Charlie Brown, we're just about to loose you, we'll see you at 1 10 15, that's about 46 minutes from now.
PAO And we have loss of signal. We'll

PAO be reacquiring Apollo 10 again in 46 minutes at that time the spacecraft will be in its 18 revolution of the moon, and we expect that the crew will still be up. They advise that they have a fair amount of activity to get the spacecraft ready for the sleep period, and to complete unsuiting and I think their evening meal before beginning the sleep period, so we expect that we will hear from them again as they come back around on the other side of the moon in the 18th revolution. We have some additional information on that aps burn to depletion. The burn began at 108 hours 52 minutes 2 seconds. A total burn time was 3 minutes 31 seconds and that gave us a delta-v, a change in velocity of 3 thousand 7 hundred 99 feet per second for the LM ascent stage. The burn was targeted to put the LM ascent stage into a solar orbit and we assume that that has been achieved. We won't have a good idea, as to what orbit it has gone into until we've had a chance to get some tracking data on the LM. During the conversation with the crew, capcom, Joe Angle advised them that if they desired we would be able to add 4 hours to their sleep cycle tonight, to make up for the amount of time that we have already cut into that sleep period, and that we would make up the time line during sleep periods later on in the mission. At 109 hours 31 minutes this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo control at 110 hours 15 minutes into the flight of Apollo 10. We're less than a minute now until acquiring the spacecraft now in its 18th revolution of the moon. The crew is scheduled to be in their sleep period at this time. However before we had loss of signal on the previous revolution we gave Tom Stafford the option of adding 4 hours to the sleep period to make up for the time that has been lost due to the additional activities, and getting a little bit of a late start - actually finishing up late with some of the activities relating to the LM rendezvous and APS burn to depletion. And Stafford advised that he would talk it over with his fellow crewmen and let us know when we had acquisition of signal on this revolution. So we anticipate that the crew will still be up and will probably be beginning their sleep period on this revolution. We should have acquisition of signal by now. We will stand by for CAPCOM, Joe Angles, to put in a call to the crew.

SC Houston, Houston, this is Apollo 10, over.

CC Hey Apollo 10, this is Houston. How are you guys doing?

SC I bet you thought we were sleeping. We were just getting dressed for the occasion.

CC Okay.

SC I got some dope for you.

CC You go ahead with the dope.

SC Okay Joe, at GET 110:15, battery C read 37 volts, pyro BAT A, 37, pyro BAT B, 37; RCS ring A says 60 percent, B is 78, Charlie is 72, and Delta is 67. The canister change has been made. The fans have been cycled, and -

SC Joe, are you still there?

CC Roger, Charlie Brown. We're standing by. We got all your readouts so far, all the way down to the fans cycled, have you anything more?

SC Yeah, we got a dosimeter reading, third is 26038, the chimp is 05308 and ... 15040 and on the Cern that was 26039.

CC Okay we got all that, Gene.

SC And the crew status is at tired, and happy, and hungry, and thirsty, and horny and all those other things.

CC Roger, we copy everything and we've got solutions and pills for everything but item 4.

SC Your in trouble when I get back anyway.

CC But we just didn't want you to forget what the good things are like back on earth, Gene.

SC How can I? I keep looking at this flight plan.

CC Hey Roger.

SC We dumped the waste water and we dropped it down to 28 - we dropped it down to 22 percent, Joe. But I guess that's alright, uh?

CC Roger, that's okay.

SC Now what else can we do for you.

CC Well let's see, Gene. You can give us a pill report and I guess you haven't had time to take any today and also let us know if you've made the water taste bad for tomorrow. And also you can zero the command module optics and I can't think of anything else right now.

SC You want us to zero the command module optics, we will chlorinate the water last thing, and we didn't take any pills yet.

CC Okay, we kind of figured that. And, let me ask you about - let me ask you about this proposed change for the flight plan for tomorrow, in other words, adding a couple of hours on to your sleep tonight. Would - did you guys get a chance to talk that over, do you want to do that?

SC I'll tell you. Okay Joe, what time would that - how many hours would that get us up from - like, what's our proposed get up time now. Over.

CC Okay, Tom, your proposed get up time is, let's see, it looks like 117:30 about, and we'd add 2 hours on to that. Okay, I just got the word, we can make that 3 to 4 hours if we wanted to.

SC How about standing by for one Joe.

CC Okay Tom, we sure will. In other words right now you're looking at about 7 hours from now for wake up time, which, I don't know how soon you're ready to go to sleep but that would give you something like six and a half hours of sleep, I'm guessing. And we could add 4 hours on to that, 3 to 4 hours which would give you 9 to 10 hours of sleep. That incidently is not going to -

SC Okay ...

CC Roger, that incidently will not compromise anything that we've got planned. We just - we got some pad time on down in the flight plan as you know.

END OF TAPE

SC All right that was the rest period in the middle of the day, there.
CAPCOM That's affirmative.
SC Hey, Joe, this is Charlie Brown. We think we'll take you up on that sleep in for at least 2 hours tomorrow, which will give us about 9 hours. I think we need it.
CAPCOM Roger. We sure copied on that Tom, and we'll go ahead and - I'll tell you what we'll do, we'll go ahead and plan - work a flight plan around giving you an extra 4 hours, and if you want to crank up earlier, we'll see what we can do about that - cranking early in the morning then, because I think you could probably use that rest too. You guys had a whale of a day today.
SC Yeah, that was quite a day. You don't do that every day. And why don't we play it like that, so give us what your proposed wake-up time is and just like this morning we got up a little early. Give us the hours for proposed wake-up time and we may beat that. Over.
CAPCOM Okay. Stand by just a second Tom. I'll get it for you here.
CAPCOM Charlie Brown this is Houston. Tom you sound like you could use a fountain of vigor about now.
SC Yeah, would you believe about two of them.
CAPCOM I don't know what you would do with them after you got them though.
SC Just throw them up, Joe.
CAPCOM I'll do that.
SC Can you uplink something like that Joe?
SC Yeah, could you uplink something like that?
CAPCOM We did our best in our flight plans and tool kits and stuff like that.
SC Yeah, we noticed that on the LRL there. Say, just wanted to ask you a question, too. How did the TV look, you know, we haven't had time to even think about it? Over.
CAPCOM Say again. How's the TV look, you say?
SC Roger. How did the TV look during that station - official station keeping? Over.
CAPCOM Roger. That was outstanding today. That was really good. Really had a lot of good detail and man that color, Tom, well I don't know what to use for a word, but you'll have to wait until you get back. That really has gone over.
SC Okay, but you can really up pick

SC the silver and the black and the flag and all that on the LM, then? Over.

CAPCOM Roger. Let's see I don't know if we picked up the LM, but we sure got - Yeah, the ascent stage was really great. We could pick up the colors on it all right. The Mylar showed up real good.

SC Hey, Joe, where do you suppose Snoopy is by now?

CAPCOM Stand by. I'll give you a readout on that, Gene. He's still sailing along, I think, let me check. Yeah, we're still tracking him. Let me get some words on how far out he is.

CAPCOM Gene, just for your info, we show about 9.7 foot a second separation and we think that we're just from that cabin venting on Snoopy after you separated.

SC Yeah, well, you know he - up there's where our hatch has this insulation has been bothering us, inching us, you know, and stored in both cabins, and when Snoopy took off that insulation just exploded all over the whole place just like a snowstorm around the moon. And out of the midst of the snowstorm, came Snoopy taking off.

CAPCOM (laughter)

SC Houston, 10. Did you say that Snoopy's cabin pressure went down to zero? Over.

CAPCOM That's affirmative, Tom. It went all the way down. Down to zero in 10 seconds, Tom.

SC Hey, Joe, I went back in a second time to make sure that dump valve was in AUTO, so it - Something must have happened to it. It was in AUTO.

CAPCOM Yeah, I copy. It's probably that forward hatch you got in the command module with you. That may have had something to do with it.

SC Yeah (laughter) sure.

SC Hello, Houston. Apollo 10. Well I guess Snoop performed real well with respect to the propulsion objective that we had for it, didn't it, when you let it off? Over.

CAPCOM Roger that. He sure did, Tom.

SC Yeah, real good. We got one heck of a lot of ... today, that's for sure.

CAPCOM Boy, Roger that.

SC Joe, if you want a lap simulation ride, let your kids get a big, a big metal bowl on your head and beat on it with spoons.

CAPCOM (laughter) okay.

SC Joe, I guess I've flown well over a hundred different types of aircraft and that made my third spacecraft, but of all of them I've never heard anything as noisy as Snoopy. It was too much. Between the fans, and

SC the bumps and those thrusters firing (Garble) it was really a kick. Over.
CAPCOM I'll bet it was.
CAPCOM You've just never been inside a dog when it was barking and kicking and scratching fleas all at the same time.
SC No, that's right.
SC It's doing everything but wagging its tail a little bit on the ascent burn.
CAPCOM Yeah, Rog.

END OF TAPE

CHARLIE BROWN This dog even wags his tail a little on the ascent burn.
CAPCOM Rog.
CHARLIE BROWN And he chased his tail on staging.
CAPCOM Rog.
CHARLIE BROWN You think that guy in the well had a time.
CAPCOM Rog.
CHARLIE BROWN Houston, Apollo 10. We have one other question. Just where did you propose that we stow that canister we brought back from the LM. Over.
CAPCOM Okay, Tom. The most logical place right now looks like it'll be in the sleep bag underneath your couch, however, what we're going to do tomorrow is run an exercise over there in the - in the mockup and figure where the set place is with all the other gear you got on board. We'll come up with several ideas and let you pick the one you like best.
CHARLIE BROWN You know, I can see what happens if that couch happens to stroke a little bit with that middle canister underneath it. Over.
CAPCOM Yeah. Well, I think it - if you keep it rolled up pretty close to your head there, up near the ordeal box, there, why the couch strokes down and toward the bottom, doesn't it?
CHARLIE BROWN Yeah, (garbled) That may be okay.
CHARLIE BROWN And Houston, Apollo 10. We're coming right back over landing site 1 in all the places. (Garbled) you starting to look like we did before. NASA road 1 we could sure pick out every little crater now. Over.
CAPCOM I'll bet you can. I'll bet it's looking pretty familiar by now, too, isn't it?
CHARLIE BROWN Yeah, we're coming right up on landing site 1 here. You can look straight ahead and there's masculine, masculine B, leading up to 13129 and I have Holkey over on the left, and out there in the plains, the Oklahoma Hills on the left and the landing site.
CAPCOM Jack - Jack Mitt's still here tonight. He says you guys were overtrained, reading off names like that. Hey, listen, Snoopy is about 6,000 miles above you and still going, and we're still getting data on him.
CHARLIE BROWN Well good. That sounds great. Sounds like you got some power left in those batteries. All we're really glad to see you get all the data on that ascent burn. Over.
CAPCOM Okay Tom, (garbled) now. I think I -
CHARLIE BROWN They going to (garbled)
CAPCOM Go ahead. I'll wait.
CHARLIE BROWN Go ahead, Joe.

CAPCOM Okay Tom, on your wake up in the morning, well on Snoopy first, they say we're expecting them power on those batteries to last till about 120 hours, so we got about another 10 hours worth of tracking it looks like. And on your wakeup in the morning, what it looks like now, the best plan is to wake you up just before LOS on rev 23, which would be at right at about 121 hours. And we'll give you a little data right away, enough to get you through the next rev and that'll give you the back side to get woke up and dressed, and break out some chow and stuff.

CHARLIE BROWN Okay, so we're looking at about 121 hours.

CAPCOM That's affirmative. And we'll call you just as - just as late as we can and still get what data we need to up to you before LOS.

CHARLIE BROWN Okay, real good. Thank you. We're right now passing over - we're exactly over masculine and here's masculine B up ahead, and we've got the Sidewinder Rille over on the right, we've got - here's Diamondback on the right, Sidewinder's on the left, and this whole chain of craters leading up to site 2. And again, if you didn't hear me. (Garlbed) that it doesn't look near as rough and as rugged out here in the mare areas as it does in the other parts. It's pretty well chained up.

CAPCOM Boy, you'll really sound good, Tom. Jack Schmitt is standing here and he says that he's setting up some briefings when you guys get back. This time you're going to be briefing him.

CHARLIE BROWN Okay, and I think we can sure tell the difference between old and new craters and the way it desites (garbled) it was very obvious. Those pictures came out, we'll show him some boulders and tell him that San Saritas A has some (garbled) great big, both white and black huge bolders on both the inside and the rim and quite a - well most of them are on the outside of the rim, but it's perfectly rugged country and stay away from San Saritas a there.

CAPCOM Okay, we copy that.

CHARLIE BROWN Hey Joe, when this surface down here, ceases to be interesting then it's time to bring us home.

CAPCOM Okay. We'll send up a replacement, Gino.

CHARLIE BROWN Well, right now it's still pretty interesting.

CAPCOM Okay, we'll leave you up there a while, yet.

CHARLIE BROWN We just went over Molkey. We got (garbled) river, right underneath us.

CAPCOM Roger that.

CHARLIE BROWN You might tell Jack that US1 when you get down close comparing it to a runway from about 50,000 feet.

CHARLIE BROWN Most be close to a thousand feet across.

CAPCOM Roger, we copy.

CHARLIE BROWN Yeah, I'd say it's -

CHARLIE BROWN Okay Houston, if Jack Schmitt's still there, we're passing over the crater. We got it named after him, it's right past ritter and sabine and right here you can see some tremendous boulders down on the opposite side rim, there. There's great big white ones. I'd say they're, oh, To see it from this altitude here they got long shadows on them, at least about a hundred feet or more in diameter, and down near the bottom, you can see where the sides are slumping in, it's more like the tailingsoff of mines And the sides are white and gray. You can see fractured structure in there, too. We got some pictures of it. Over.

CAPCOM Very good. We copy all that, Tom. Thank you.

CHARLIE BROWN And right now, we're still just looking at US1 as it disappears over into the terminator.

CAPCOM Roger. Tom, speaking of the cameras, do you have any - any of those camera problems you want us to try and work on tonight. It sounded like you had some problems other than film packs. Is there anything we can help you out with, trying to figure out tonight?

CHARLIE BROWN Joe, those were preflight problems. And the main thing, the backs we can see, weren't fitted to the camera and run through and the batteries on them, my Hasselblad went dead, just as I got to the site. I hope I got some pictures of it. I got all the approaches into it. Over.

CAPCOM Very good.

END OF TAPE

SC For preflight problems, and the main thing, the backs, we could see weren't fitted to the camera and run through, and my batteries on my hassleblad went dead just as we got to the sight, I hope I got some pictures of it. I got all the approaches into it, over.

CAPCOM Very good, understand Tom.

SC And tell Jack tomorrow we're going to get him a picture of this, the US1 suddenly jumps side ways up here, and maybe that's the strike football he's been looking for but it suddenly jumped sideways and you can see it or else maybe just another one has gone into it.

CAPCOM Okay

SC It fades out. It's been elevated in certain areas here.

CAPCOM Rog, we copy, that's good to hear, and on the cameras, Tom if you run into a problem tomorrow, or you want both hassleblads available, Jack says you can put one battery in each camera and it should operate okay.

SC Yea, okay, we'll give that a try tomorrow. We'll be all ready to go after them and what we're doing now is we're passing the terminator. We're going to go ahead and sack out it's been a long day and we're just watching, still love to watch the moon scape go by and observing here as we go on to the terminator, and we'll be talking to you tomorrow morning, over.

CAPCOM Okay, mighty fine, Tom. That sounds good and we'll talk to you some more about data and stuff in the morning. On your LCL recovery check list before you back pack that stuff all the way, tomorrow we'll just go through them and you can just call down the item numbers and let me know where you have them stowed so we can work out your CG. Over.

SC Okay will do.

CAPCOM And I guess that's about it. We want you to know you guys did one whale of a job today. You really did us all proud. The big troups on the back row walked out of here shaking their heads and grinning from ear to ear, they could have eaten a banana sideways and never touched it.

SC Well great that makes us real happy. It was a heck of a work load. One thing I wanted to check on. It looked like on board, Joe the landing radar did a great job on locking on, a pretty good altitude preforming all the way through, have you got any word on that yet, over.

CAPCOM Roger, that agrees with what we were looking at down here Tom. It looked like it performed just real well.

SC Okay now one reason I wasn't able to hold that light on exactly 10 degrees, it was off a few tenths, and even up to 1 degree, the rate needles on the attitude error indicator weren't calibrated so I had a zero pitch rate. Actually it ended up at the end with that calibrator just before docking was 3 tenths of a degree off. And I was trying to just eyeball that and eyeball the Dsky but I think we got what we wanted was in the local horizonal reference there, over.

CAPCOM Okay, we copied all that.

SC Also, just a couple of more copies. It was a real ride, that ascent engine was, I guess we had the longest burn on it to date, and it takes you on quite a little pitch and yaw excursion there as you take off. I mean it continues on you know the way with a non-gimballing engine, but yet it burned out beautifully on residuals but you're really hicupping back and forth on that babe, it was quite a ride for 15 seconds. Over.

CAPCOM Rog, I'll bet, and I bet it got pretty sporty there towards, you had a pretty light vehicle there didn't you?

SC Oh yea, just one ... pings, you go back and it really takes off. Also the vehicle's so light that you notice all the structure shaking when you fired pulse. And it sounded just like you'd awakened inside of a rain water tub with somebody beating on it with a bongo drum.

CAPCOM Is that right.

SC Yea, it's quite a machine.

CAPCOM Tom, this is Houston, we've been talking with the Doctor and it sounds like there's only one way that we can get you unwound and to sleep tonight. We're not sure how to get that up to you.

SC Yea understand. Understand, Joe. Well we'll sack out shortly, but after a day like that we just want to talk about a few things there and relax.

CAPCOM Yea, we sure understand.

SC Houston (Garble) little switching around over here.

CAPCOM Roger we're still reading you 5 by Geno.

SC Okay, I'll be listening for you tonight.

CAPCOM Gene very good, and we'll try not to bother you.

SC Don't feel bad if you have to.

CAPCOM Barb called over just a few minutes ago, she stayed up right till the end listening, and she was happy as could be.

SC Appreciate that.

END OF TAPE

CAPCOM We've been keeping in pretty close touch with all the gals. In fact for all 3 of you guys those gals are running to read the flight plans and the check lists, and they keep asking us when you're going to do this and why you didn't do that, and they come up with some pretty embarrassing questions sometimes.

SC Yea, and we've got enough of those people, we don't need anymore.

CAPCOM You've got 3 of them waiting when you get back.

SC Yea I guess we'll take it in stride -

CAPCOM Rog.

PAO This is Apollo Control. We have about 1 minute 15 seconds now before we loose contact with Apollo 10 as it goes around behind the moon on this the 18 revolution. Flight director Milton Wendler has gone around the room and checked the status of the spacecraft with all of his flight controllers before we loose contact. Everything appears to be in good order at this time. The flight surgeon advises that the crew appears to be either asleep or going to sleep at this time, and we don't expect that we'll hear anymore from them for the rest of the sleep period. They do have the option to extend this sleep period through 121 hours ground elapse time if they so desire. Tom Stafford, said that they may be up and about somewhat before that, if they're not up by that time, the ground would awake them. And we should have loss of signal just about now. And our ecom advises that we do have LOS. We'll be prepared to come up again when we reacquire contact with the spacecraft, although I don't expect we'll have anything more than telemetry information at that time, which will be about 46 minutes or so from now. At 111 hours 28 minutes, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/23/69, GET 112:14 CDT 0403 399/1

PAO This is Apollo Control, 112 hours 14 minutes. We have acquisition of signal from Apollo 10 now. We've been advised that we do have telemetry data from this spacecraft and we don't expect any voice communications from the crew on this revolution. We're now in the 19th revolution of the moon. And we expect that all three crewmen are sleeping at this time. We only have biomedical data at the present time on Gene Cernan, and that information shows that he is sleeping soundly and has been since 111 hours ground elapsed time. Following the rendezvous and separation maneuver from the lunar module, our displays here in Mission Control show that the Apollo 10 spacecraft is now in an orbit with an apogee of 65.4 nautical miles and a perigee of 56.2 nautical miles. Our velocity at the present time is reading 5369 feet per second. And at this time the spacecraft is at an altitude of 56.3 nautical miles. We'll continue to stand by for the early part of this pass while we get an initial look at the spacecraft systems, and then take the circuit down unless there is some conversation with the crew. Apollo 10 is now approaching the Sea of Fertility on its 19th revolution and telemetry data from the spacecraft shows us that the cabin pressure is maintaining a constant 4.9 pounds per square inch, which is normal. And the cabin temperature at this time is 77 degrees. Here in Mission Control our flight controllers are involved in updating the flight plan to reflect the additional 2 to 4 hours of sleep that we expect the crew will be using tonight. And the flight plan will be modified to take this into account in effect moving activities down approximately 4 hours toward the rest period that is scheduled just prior to transearth injection. And, with the assumption that the - this brief rest period, which is scheduled almost - more as a short nap prior to TEI, would be shortened to give us some additional sleep time tonight following yesterday's very busy scheduled activities. At 112 hours 26 minutes, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/23/69, GET 113:30 CDT 0519 400/1

PAO This is Apollo Control at 113 hours 30 minutes. We had loss of signal from the spacecraft about 5 or 10 minutes ago. We'll be reacquiring in about 41 minutes. The Flight Dynamics Officer reports that the lunar module ascent stage is now 15,161 nautical miles from the moon. The vehicle has escaped the earth-moon system and is in a solar orbit. We are still getting telemetry information from the vehicle and the estimate is that the electrical lifetime of the stage will extend through 120 hours ground elapsed time. At 113 hours 32 minutes, this is Apollo Control.

END OF TAPE

APOLLO 10 COMMENTARY, 5/23/69, CDT 0603, GET 114:13 401/1

PAO This is Apollo Control at 114 hours 12 minutes. Apollo 10 now on its 20th revolution of the moon. We have acquisition of signal, and our receiving data from the spacecraft at this time. The crew has been asleep now for about 3 hours. The sleep period has been extended to 121 hours ground elapsed time, due to the fact that the crew was a little longer than anticipated in beginning the sleep period. The spacecraft cabin temperature has been running about 75, 77 degrees, and cabin pressure holding at 4.9 pounds per square inch. The lunar module ascent stage is now about 17,580 miles from the moon, and it's traveling at a speed of about 5,476 feet per second. We should continue to get telemetry information from the LM for about 6 more hours. Estimate that the battery lifetime of the vehicle will extend at least until 120 hours ground elapsed time. In about 30 more minutes, we'll be having shift handover here in Mission Control. Some of the orange team of flight controllers are now coming on duty and they will be getting briefed from the previous team during the next 30 minutes with handover to come. At 6:30 Central Daylight Time. At 114 hours 15 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/23/69, CDT 0714, GET 115:25, 402/1

PAO This is Apollo Control 115 hours 25 minutes ground elapse time. 5 hours 34 minutes remaining in the Apollo 10 crew sleep period. The orange team of flight controllers has settled in for the day here in mission control. The ascent stage of Snoopy is out in excess of 20 thousand miles away from the moon, going into solar orbit. The spacecraft, as we had loss of signal around the back side of the moon, a few moments ago, on the command module was all functioning quite well. The crew apparently sleeping well, and at 115 hours 26 minutes ground elapse time, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/23/69, CDT 0759, GET 11610 403/1

PAO This is Apollo Control at 116 hours 10 minutes ground elapsed time. Apollo 10 has just come over the hill on the 21st revolution around the moon. Orange Team Flight Director Pete Frank is having lengthy discussions with all of the console positions here and sorting out the various status of the - various systems status. We have 4 hours 48 minutes remaining of the crew rest period, which has been extended about two revolutions so that the crew can rest after a rather busy day yesterday in their rendezvous sequence. We have loss of signal from the spacecraft in another hour and 10 minutes in this rev as it goes around behind the moon again. We're now showing a measurement of the command module orbit around the moon, an apocynthion of 66.1 degrees - as you were, nautical miles, 55.7 nautical miles pericynthion. In slipping the lunar orbit activities two revolutions, or approximately 4 hours, the lighting and landmark appearances and so on will remain essentially the same, as if they had been done on the preflight schedule. It's rather quiet here in the Control Center, very little noise other than on the communication loops. At 116 hours 12 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO - calling back to earth. Let's listen in.

PAO It's reported on the ground here that the crew is conducting a fuel cell purge and a charge of battery A. They made one brief call to earth which was responded to by -

SC align, and I'm purging the fuel cells at this time. I've gone to mode 2 and 3 and I'm on 2A now.

CAPCOM Roger, we copy.

SC How are things in Houston this morning?

CAPCOM Everything's great. Everybody's raving about your performance yesterday and very happy. No doubt you guys are equally well pleased.

SC SC It's been a good day, Jack. Pretty challenging and pretty satisfying really, when we look back at it.

CAPCOM Apollo 10, this is Houston. You got up kind of early this morning. We were going to let you sleep in for quite a while yet. We've got a little information that will be of interest to you. Your consumables are away ahead of schedule as usual. We have you in a 65.9 by 55.6 orbit. Your spacecraft looks real good. You might be interested to know that the LM ascent stage is 23 000 miles from the moon heading straight up at 5400 feet per second, and haven't quite been able to tell yet whether it's going into orbit around the sun or it's going to head straight at the sun.

SC - - isn't he? 23 000 miles away?

CAPCOM Yes, Old Snoop is really moving out.

SC I hope I didn't leave my watch aboard there.

SC You can still track him, can you?

CAPCOM We're still tracking him.

SC You can't?

CAPCOM That's affirmative, we're still tracking him and checking the LTC and so forth.

CAPCOM As a matter of fact, we just a new memory dump off of him.

SC You got a memory dump?

CAPCOM That's affirmative. Old Snoopy doesn't give up.

SC Holy smoley.

CAPCOM And 10, this is Houston, I've got a congratulatory message here. It says, "Congratulations on doing what I've been trying to do for a long time." Signed The Red Baron.

SC Beautiful.

SC Houston, I've got a status report for you.

CAPCOM Roger, go ahead.

SC We're all feeling good, and we're about

SC ready to (garbled). We got in about 5 to 6 hours pretty fair sleep. ... is 26040; the temps is 05309 and 15041. Cycling the (garbled).

CAPCOM Apollo 10, Houston, you're coming in very broken. We're going to have to repeat the report. Wait one until we check out the network. Over.

SC How do you read me now, Jack?

CAPCOM You're cutting out. Let's attempt to fix it up with the network and then we'll give you a call in a minute.

SC Roger.

CAPCOM Okay, Apollo 10, this is Houston. We're ready to try it again. Go ahead with your crew status please.

SC Okay, we got 5 or 6 pretty good hours of sleep last night. Tom's fixing chow, John's taking targets of opportunity and our rad readings are as follows in order: 26040 05309 and 15041. The purge is complete and the fans have been cycled.

CAPCOM Okay, Geno, we copy your 5 to 6 hours, 26040 05309 and 15041, and we'd like you to operate in BD roll today. Over.

SC You'd like us to operate -

END OF TAPE

CAPCOM Okay, Gene, we copy. 5 to 6 hours, 260400503915041, and we'd like you to operate in BD roll today, over.

SC You'd like us to operate in BD roll today.

CAPCOM That's affirmative.

CAPCOM Apollo 10, Houston. When you're ready I have some updates, and we have the morning newspaper.

SC Jack, stand by on that for a minute. We'll all get on a head -

SC Hey, Jack.

CAPCOM Go ahead.

SC Okay, doing a little troubleshooting on our 70-mm Hasselblad. It turned out that the batteries are good, but the lens, you cannot take the lens off, and what I really anticipate probably is that little docking pin on the lens is jammed. We never did have it off so it wasn't a case of putting it on wrong, but it appears to be jammed and I can't get the lens off at all. Do you have an idea that might help us troubleshoot this one?

CAPCOM Okay -

SC Do you want me to break out my tool kit, Jack, and take that thing apart?

CAPCOM Stand by. 10, Houston. We'll get an answer to you on which camera procedure to use. We're working on that now.

SC Hey, Jack, I think that's what it is though since I can't take the lens off and the batteries are all good, it appears that it may be jammed.

CAPCOM Roger, thank you.

SC Okay, Jack, tell the camera experts to forget it. I got it psyched out. I had to spin that gear wheel around until I got the flat side up and now it appears to work, but it was apparently some sort of self jamming capability.

CAPCOM Roger, we copy. Neatly devised.

SC Hold off. We're letting it work for one minute and let me see what happens.

END OF TAPE

SC Hey, Jack.
CAPCOM Go ahead.
SC Okay, here's the story on the camera.
CAPCOM Say again, please.
SC Okay, I've got a story on the camera. Need some help, I guess, all right?
CAPCOM Roger, go ahead.
SC - listen for a second. Okay, the gear on the back, gear on the back when you take the magazine off, this is on the camera base itself, it's got teeth on it except for one area where there is a flat spot. If you turn the gear over, push the gear over so that the flat spot is face up, I can do two things. I can snap the picture and/or take the lens off. But as soon as I snap one picture, the gear does not rotate and I cannot take the lens off. The lens does not lock and the camera will not cycle any more after that. Now this occurs both with and without a backup.
CAPCOM Okay, Gene, we copy that. We will get to work on it.
SC Okay, thank you, Jack.
SC Remember, Jack, the right kind of picture and we might find out how all this started.
SC Houston, this is 10. One little bit of further information on that camera base is the fact that when I do get it cocked for that one shot it'll take, that gear does not rotate so as to turn the film pack over. It doesn't even rotate without a film pack in it.
CAPCOM Okay, we copy that the gear won't rotate with or without a film pack in it after taking a picture, is that affirmative?
SC Yes. I can send it through one cycle myself and it's all recocked and I have to do that with a pencil to work that gear around and it's recocked, then it works fine for one more shot, then that's it.
CAPCOM Roger, we copy that the gear cycles - has to be cycled manually as opposed to turning automatically after taking a picture.
SC I'll play with it a little while longer and see if there's something screwed up in this lens.
CAPCOM Roger, we have people working on it.
SC One final little bit more of information. When I did - recocked that gear, took the lens off it and recocked the gear, I get a one-shot affair and it appears that the mechanism that's jamming is not in the lens and it's obviously not in the pack, but it's somewhere in the body of the camera.

CAPCOM Roger, we copy.

CAPCOM Apollo 10, Houston. Could you give us an inventory of which cameras you have working and which ones you're having problems with at this time, over.

SC Okay, we've got one 70-mm camera with all three lens, LM lenses, two CSM lenses, and I guess we've got two sequence cameras working.

CAPCOM Roger, one 70-mm and two sequence cameras.

END OF TAPE

PAO This is Apollo Control during the break in communications here; the crew is apparently getting ready for breakfast - we'll come back and review the activities since they woke up. They woke up almost on the preflight time line, however, it had been planned that they would sleep in another 2 revolutions, or approximately 4 hours later than the normal time. A lengthy discussion took place between Spacecraft Communicator Jack Lousma and LM Pilot Eugene Cernan on how to trouble shoot the jammed still camera aboard the spacecraft, the one that was taken aboard the LM for the low altitude lunar photography. Both - or all 3 crewmen got 5 to 6 hours good sleep; the dosimeter readings on all 3 men were read down to the ground. The ground reported that the LM, the lunar module ascent stage, was some 23 000 miles outbound toward the sun, traveling at a rate of 5400 feet per second. And possibly before loss of signal some 14 minutes from now, as the spacecraft passes behind the moon, the morning news will be read up to the crew. We'll continue to monitor air-to-ground through loss of signal on this the 21st revolution around the moon, for any further conversation between Apollo 10 and the Mission Control.

CC Apollo 10, Houston. We'll be going LOS in about 10 minutes; and I still have rev 22 update and an oblique photography update for you.

SC Okay, Jack, I'll copy it. Go ahead Jack, I'm ready to copy it.

CC Okay, the map update pass rev 22 -

END OF TAPE

SC Go ahead, Jack. I'm ready to copy it.

CAPCOM Okay, the map update pad rev 22: 1172253 1193246 1180903. Sunrise 1173600, Sunset 1184826. Ready for your readback and go ahead on your photography update.

SC Okay, 22 LOS 1172253. 150 is 119 - Sunset. Houston, did you get that?

CAPCOM Okay, 10, this is Houston. No, you were cut off part way through the readback. Start at 150 please.

SC 1193246 1180903 1173600 1184826.

CAPCOM Okay, that's affirmative. You ready to go ahead with LS2 photography pad?

SC Yes, I'm ready to copy something, John - or Jack. Goahead.

CAPCOM Okay. LS2 pad: F is 118 28 52. P1 is 1183315, with your TCA at 2 minutes. F28 is 118 34 15 with your TCA at 1 minute. P2 is 118 35 15 TCA.

SC Hey, Jack, I got that all down, but I'm not sure what you all said. I'm looking for the pad that it goes to.

CAPCOM Okay, it entitled "Oblique Photography" and F8 is Camera on, P1 is start a half a degree -

SC Yes, but what page is that - don't we have a update here somewhere? Can you give me the page it's on?

CAPCOM Apollo 10, Houston -

SC Jack, we don't have the same -

CAPCOM Roger, on the flight plan -

SC Jack, can you tell them like it is -

CAPCOM Roger, on the flight plan page 3-71 we have an update for oblique photography. However, that format has been changed and a new format I have given it to you.

SC Well, we can't change it.

CAPCOM 10, Houston, we'll give it back in the old format for you.

SC (garbled) I wish you would. We don't understand the new one.

CAPCOM Roger, we'll get it back in the old format and -

SC I've got all the words, Jack.

CAPCOM Okay, we'll get it back in the old format and check with the appropriate people and meanwhile I have a correction on your map update pad. You'll be crossing 150 west at 117:33:36.

SC Yes, I guess that sounds a little bit better. Listen, while you're getting it in that old format tell me what you told me because we're going to lose

SC LOS and maybe we could do something with it here.

CAPCOM Roger. We want the camera on FA at 118:28:52 and we want you to start your half degree per second pitch rate at 118:33:15 and we want you to go F28 at 118:34:15 and then you can stop your pitch at 118:35:15.

SC Okay, we'll turn the camera on at FA at 118:28:52. we start a half a degree per second pitch rate at 118:33:15, we go to F2.8 at 118:34:15 and then we stop our pitch at 118:35:15.

CAPCOM That's affirmative.

SC Hey, I knew you guys just couldn't wait until we got airborne and then you changed all the formats. How about that.

SC That's what we get for missing that data priority meeting you had after liftoff.

CAPCOM Okay, Apollo 10, Houston. Before you go out of sight here some more information on your update for LLS2. Your roll should be 180, your pitch 339, and your yaw 000, and the PCA numbers we were giving you were time of closest approach so that P1 would be 2 minutes before closest approach and you go to F28 1 minute before closest approach and then P2, of course, is time of closest approach. Over.

END OF TAPE

PAO This is Apollo Control. Apparently we have had loss of signal from Apollo 10 as it went over the hill on the 21st revolution. Toward the end of that pass the spacecraft communicator Jack Lousma passed up to the crew some pointing angles and times for some stereo strip photography of landing site 2. The strips will be forward looking as they approach the landing site. The camera will be started when their landing site is first on the lunar horizon, and then the spacecraft will be pitched down to keep the landing site within the camera view until the camera is vertical to landing site 2. Most of today's activities will be photographic tasks, lunar landmark tracking tasks. In the photography task will be included stereo strips from terminator to terminator. In other words, the shadow of the moon where the sunlight leaves off, where the sunlight begins all the way to where we have lunar twilight or what is called penumbra. We have 44 minutes, 14 seconds until next acquisition on the 22nd rev, and at 117 hours, 24 minutes Ground Elapsed Time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 118 hours, 08 minutes ground elapsed time. Less than a minute away now from acquisition of signal as Apollo 10 comes around to the front side of the moon on lunar revolution number 22. During this pass the crew is scheduled to do the stereo strip photography across landing site number 2, at which Apollo 11 likely will land. Also as the communications commense in this rev, the crew will be a consumable update, standing by for communications to resume. A few minor changes in the flight plan will be read up to the crew however it appears now that they woke up and called Houston about on the normal flight plan time, and the flight plan is now back on the time line. We likely will have colored television beamed to the Madrid station where it will be recorded during this pass, and perhaps a subsequent pass, and it would be released in the United States on a delayed basis as soon as the video tape could be flown here. However, it would go out in real time to the European television stations. Standing by for the fist call. We've got 1 hours and 11 minutes until loss of signal on this 22nd rev. It'll be 119:21 when the Apollo 10 goes over the hill. Also during the updating from the ground to the crew of Apollo 10 will be whats called a TEI 23 pad, which would simply mean numbers for transearth injection burn, should it become necessary at the end of the next revolution, number 23 - this is strictly sort of a back-up bit of information.

CC - over.

SC Hello Houston, Apollo 10.

CC Roger Apollo 10, read you loud and clear. OMNI.

SC Roger, Jack. We're all set up and we're getting ready to take obliques of the landing site 2. Over.

CC Roger Tom; when you've got time, we've got lots of information for you here.

SC Roger - just to reconfirm - for the obliques on landing site 2, you want the 80m lense in intervalometer; over.

CC Stand by; we'll get an answer.

SC Okay.

CC Okay, Apollo 10, Houston. We confirm we want the 80m lense in intervalometer on obliques for site 2; over. Apollo 10, Houston, did you copy? We want the 80m lense with the intervalometer.

SC Houston; we're down to one sequence camera cause we don't have a power cable for the camera we brought back from the LM.

CC Roger, we copy John.

SC Jack, did you read us?

CC That's affirmative; we copied. Gene, one sequence camera and one power cable ought to do the job.

SC Jack, we just want to confirm; we use a black and white on this oblique photography - do you want F8 or F4 at 250, and then down to 28?

CC Apollo 10, Houston, use F4 for the black and white film.

END OF TAPE

CAPCOM Apollo 10, Houston. Your camera settings we read up at 1250 is go to F4 and you will get better pictures later on if at 11834 you go down to F28, over.

SC Houston, Apollo 10, over.

CAPCOM Go ahead, 10.

SC Roger. Is Jack Schmitt around anywhere today?

CAPCOM Yes, he's hear today. Did you copy our last about the F stops and the speeds and so forth?

SC Roger, F4, right?

PAO This is Apollo Control. Apollo 10 crew at this time is apparently quite busy, getting lined up for the stereo strip photography of landing site 2. It has been rather quiet here as they approach that position. They are now at about 50 degrees east longitude, coming up on landing site 2 in the next several minutes. They should be directly over the site at 118 hours 35 minutes, which is about 10 minutes from now. We will continue to monitor the air-to-ground circuit as conversation does come from Apollo 10. Getting the camera set up with the proper setting on the exposure, proper film magazine, using an intervalometer, which is a device that automatically triggers the camera at a given spacing of pictures while they tilt the spacecraft down to keep the landing site centered in the viewfinder. Continuing to monitor air to ground here for resumption of conversation.

CAPCOM Apollo 10, Houston. We have the final change, change 12 on the camera setting. On the 80-mm camera -

SC Roger. Go on change 12.

CAPCOM On the 80-mm camera, should be set at 1/250th and at 2852, it should be set at F8 when you turn them on. At 3415 -

SC That's 250th at F8.

CAPCOM That's affirmative. Then at 3415, you will get better pictures if you will stop to F28 and stop on the time read up to you. Then, one other item of information, actually we would like you to perform this. We would like you to put both H2 cryo tank heaters to auto. Over.

SC Okay, both H2 are on auto now. Okay, so we will have F8 at 1/25th at 1182852, 1/2 degree per second at 183350, and then we will go to F2.8 at 1/25th at 18 3415.

CAPCOM That's all correct, Tom, expept for the time. It would be 1/250th, one over 250, over.

SC Oh, it's 1 over 250. Okay, we go to F28 at 12 -

END OF TAPE

CAPCOM - time. It should be 1/250th, 1 over 250, over.
SC Oh, it's 1 over 250. Okay, we go to F28 at 1/250th?
CAPCOM That's affirmative. All of your times should be 1 -
SC Okay, Jack. Let's go over this again, doggone.
CAPCOM Okay, Tom, at 2852 you turn your camera on. Your 80-mm setting should be 1 over 250 and f/8. Start your pitch rate at 3315 and stop down to f/28 at 3415 but your time will still be 1 over 250, and then stop your pitch on T2 as indicated.
SC Let's go -
SC Houston, Apollo 10, over.
CAPCOM Go ahead, 10.
SC Where do these changes to these film settings come from?
CAPCOM Apollo 10, Houston. We believe that this information was made clear. It's coming from the camera people and it's information that we set up initially, over.
SC Okay, we'll talk about it after we get back on the ground.
CAPCOM Roger, 10.
SC Houston, Apollo 10. I'm looking straight down at Sidewinder Rille.
CAPCOM Roger, 10.
SC Houston, this is Apollo 10. The reason I asked that question is I just shot up a bunch of film on the backside at f/4 250 in black and white.
CAPCOM Roger, those were the standard settings but the settings we're giving you now are the best ones for oblique photography, over.
SC Okay, thank you.
CAPCOM In other words, 10, the settings we're giving you now are better than the standard settings, but f/4 is standard.
SC Okay, Jack, peace.
SC (garble)
CAPCOM Say again, Tom.
CAPCOM Apollo 10, Houston. If you're transmitting you're coming in broken, over.
SC Okay, we're coming around to the landing site now.
CAPCOM Roger.
SC Tell Jack Schmitt there's some very interesting looking live impacts here on the backside and

also some very interesting looking things that sort of look like volcanoes. There's one on the backside that I - that if it was in a different setting you would call it Mount Fujiyama.

CAPCOM Ah so, gazaimasu.

END OF TAPE

SC ... Apollo 10, I'm looking backwards past us (garble) couple of minutes. I'm looking down now (garbled) all types of volcanic domes and uprisings out here. Looks like you've had tremendous volcanic action.

CAPCOM Roger, 10, we copy. You're coming in a little bit broken, though.

SC Roger, Houston, Apollo 10. Over.

CAPCOM Okay, you sound better, John.

SC Okay. This morning when we turn turn around first time we had about maybe a foot and a half or more of mylar with that insulation coated on the back of it. It would appear out in front of our window, and I guess it was from the top hatch which is where that insulation came from in the first place. It just sort of sat there for a while and then quietly floated off. But my question is will this cause us any thermal problems? And my answer is I guess probably not.

CAPCOM John, Houston, we didn't copy the first part of your transmission. You were broken. We'd like you to say again your observation, and we'd also like to get some information as to whether or not you are noticing any moisture collecting around that hatch. Over.

SC John's going up and take a look at it now.

CAPCOM Roger. We have some questions we'd like to ask you regarding that that you might be able to help us out with while John's up there doing that. And we'd like you to go over again the description of the forward hatch thermal blanket damage, and describe your recollection of the location and the directions and the general appearance of the edges of the tears, and the reason we want this is because we're CPBing it today on 107 and we need the information.

SC Okay. What the problem was when we opened the pressure equalization valve it just blew the insulation blanket right up, and I don't know how much air was going in there, and we didn't open it any more than cautiously on that first time, I'll tell you that. And so it wasn't being opened very fast, and what it did was it blew the blanket right up and from then on it blew all the insulation out from down at the mylar covering, right in the center of the hatch, right in the pressure equalization valve, right around that area. So it seems to be a problem in attaching around that location. Realize that it's got to put up with the air that comes out of the pressure equalization valve, which could be a pretty considerable force if you haven't thought about that before. I can see how it would have to be (garbled)

SC Houston, Apollo 10. Just inside the command module we picked up the bag that you stow your gloves in inside the helmet. We have one of those bags in jettisoned Snoopy completely full of this fiberglass mylar

SC in it.

CAPCOM Roger, 10, understand that when you opened the pressure equalization valve the insulation blanket blew up and then blew out insulation from around the pressure equalization valve and you filled the whole bag up and is that affirmative?

SC That is affirmative, and we still have - still finding considerable pieces of insulation in the command module and Snoopy looked like a snowstorm hit it inside there. Needless to say it makes you itch quite a bit, eyes, ears, nose, all over, but there's no problem (garbled) Of course we didn't realize (garbled).

CAPCOM Apollo 10, this is Houston, you're getting unreadable. We're going to have to clear up this comm before we go on. Over.

SC (garbled)

CAPCOM 10, this is Houston, let's activate your high gain and see if it's any better.

CAPCOM Apollo 10, this is Houston, and could you continue on with your description of the milar insulation please.

SC Right, Jack. I'm sure you remember from LM 3 and we had the same problem initially on LM 4 when we vented the forward hatch in the altitude chamber, how all the mylar blew out and it blew out the skin on the top side, well this is exactly what happened except we just had a few layers of mylar in all this fiberglass insulation or something of that nature down below it, and when the mylar - there just was no provisions made for really properly venting through the mylar and when that blew out that let all the insulation just flake out in the tunnel and the probe and drogue were just packed in there with all this fluffy insulation. And so I'm not sure of the total design criteria for the new fix, but you sure want to fix it before the next command module flies because we've been itching and scratching in here for about 3 days. Over.

CAPCOM Roger, we copy Tom. Have you noticed any formation of moisture up around the forward hatch?

SC That's affirmative. There are some beads of water up there right now.

CAPCOM Roger, copy, beads of water. Thank you, John.

SC And it's on the steel outer rim which is that seat that -

END OF TAPE

SC - up there right now.
CAPCOM Roger, copy beads of water. Thank you, John.
SC And it's on the steel outer rim, which is that seat that sits against the seal. It's that outermost aluminum rim and it's just covered with beads of moisture. For that matter, the whole tunnel walls are kind of moist, but it's nothing. It's nice and cool up there.
CAPCOM Roger. That's another question we wanted to ask you. How was the cabin environment up there during the night. Was the temperature and humidity higher than before? Over.
SC It was great.
SC The inside of the cockpit feels great. The only complaint is just all of the itching and scratching we have due to the fiberglass, over.
CAPCOM Roger, thank you.
SC Jack, could we get a consumables update from you, a complete one?
CAPCOM Roger. Consumables up date follows: for GET of 117, RCS total 61, A 51, bravo 70, charlie 62, delta 62, H2 total 30.4, O2 total 392, your RCS is 15 percent above the flight plan. Also have flight plan updates and we are ready for the state vector update when we can have your computer.
SC Okay, we're in POO in accept. We are ready for the state vector.
CAPCOM Roger, it's coming at you. I have a TEI pad and a flight plan update for you.
SC Go ahead with the update, then I will take the pad, Jack.
CAPCOM Roger. The flight plan update: way up the line, at 135 hours after LOS, we will have our waste water dump and all lunar activities are still about 12 minutes later than the preflight times and that's the completion of the flight plan update.
SC Waste water dump at 135 hours, thank you.
SC Okay, Jack, go ahead with the pad.
CAPCOM Okay, I have a TEI number 23 maneu- pad. SPS G&N 36818 - 061 + 076 121 41 0832 + 29928 + three balls 90 + 01628, NA, pitch is 068, the rest in NA, over.
SC Okay, I've got TEI 23 SPS G&N 36818 - 061 + 076 121410832, NOUN 81 is + 29928 + three balls 90 + 01628, roll is NA, and pitch is 068, and the rest in NA.
CAPCOM That's affirmative on that copy and I have the vertical stereo pad and a rev 23 update.
SC Okay, go ahead, Jack.

CAPCOM Okay. Your map update pad, rev 23: LOS 1192126, 1193246, AOS 1200736, sunrise 1193444, sunset 1204711, over.

SC Okay, rev 23 1192126 1193246 1200736 11934444 1204711.

CAPCOM Okay, and I have a vertical stereo pad for you. TO 1194131 T1 1201058, T2 1202011, T3 1203018 and if you want to delay your roll at the subsolar point, you will be at 75 degrees East at 1201656, over.

SC Okay, got TO11941311201058120201112030 18, 75 East at 1201656.

CAPCOM That is affirmative and also would like to tell you something about your PU valve precedure. It's changed since the last one. The new procedure is this. Start with the PU valve in the normal position for TEI, and after you bring in the second bank of ball valves, then go to increase. The old procedures could cause a transient on startup, over.

SC Okay, Jack, I got them. Normal for start, we get four balls go to increase. And I guess we're all on now, if you want to pass us up that news you were going to do earlier. We're listening.

CAPCOM Roger. I want to tell you also that you got the computer back. We're finished with the uplink. You can go to block.

SC We're in block.

CAPCOM Apollo 10, Houston. Before we go on with the news, we'd like to advise you that it's been decided that we will remove the insulation from the hatch of 107 and we tell you that so you just don't worry about not having much up there in yours and we also want to know if you're having any problems inhaling or any problems breathing because of this insulation problem, over.

SC I figured that last question would come up as soon as we mentioned it. No, we've just been sneezing and coughing for 3 days and we understand what the problem is and how to take care of it, over. We just wash them down and everything is okay. It's just kind of irritating and itchy, over.

CAPCOM Roger, sounds like living in the Dust Bowl in Oklahoma.

SC Yes, I had some good training on that area.

SC That's right. He was right at home.

SC It's not that way now. It's a beautiful place now, Jack.

END OF TAPE

CC Okay, Apollo 10, you've got LOS and AOS; we are well caught up on information going up, so lets go up with the news now. Prague, Czechoslovakia - USS Astronaut Frank Borman, one of 3 lunar pioneers on the Apollo 8 moon flight last year has been awarded the Czech Academy of Sciences Gold Medal for service to sceince and humanity. About 1000 Czechs, shouting "Long live, glory, glory" greeted Borman, first American to win the award, as he stepped from the Academy building Thursday. "By the end of 1970," Borman told the news conference, "we'll be able to take scientists and doctors of many nations on flights to the moon." New York - Johnny Carson was honored Thursday as the Performer of the Year by the International Radio and Television Society. Carson told the audience at the Americana Hotel that he was once chewed out by a station manager for over sleeping and missing a broadcast. "So I got cocky and told them that someday I would have my own network show and win an important award." Carson said. And the station manager said, "The day that happens, they'll send a man to the moon." Hong Kong - Communist Chinese authority - (laughter) thought you'd get a chuckle out of that - Communist Chinese authorities have confiscated a Hong Kong fisherman's fishing permit because he played hookey from Mao Tse Tung's thought study classes. A Hong Kong Government spokesman said today, "The licenses allowed him to operate in Hong Kong and Chinese waters." Washington - one of our old friends, Charles A. Lindbergh, the Lone Eagle of pioneer aviation, says rocket pioneer Robert Goddard told him in 1929 a moon voyage was theoretically impossible - theoretically im - correction - theoretically possible, but economically improbable. In a rare public utterance, the reporters and news photographers barred, Lindberg philosophies about the future of American aviation, and reminisced about Goddard. He said Goddard told him it was possible to send a multi stage rocket to the moon; then he smiled a little bit and said, "It might cost a million dollars and of course that was out." Calton, England - Fred Alder, 67, saved all his life to buy an 11 bedroom house on the sea to give children from poor homes a vacation. "It's the happiest day of my life." Alder said, as the first contingent of 20 youngsters arrived at the house that cost him almost 20 000 dollars. He said 200 children will have 10 days at his new seaside home by the end of summer. And a trust fund has been set up for the future. Oh yeah, we heard again from that unemployed local philosopher. With all the excitement he lost his head and digressed from his favorite subject of color television to say, "That for 3 fellas, by their own admission, who could not figure out which way was up, you sure did a doggone respectable job yesterday." And here's the

sports news. Houston beat Montreal, 7 to 4. Atlanta beat New York 15 to 3. And the Cubs defeated Los Angeles last night 3 to 1. John Young has had these interesting astrocasts. Today it is, "Keep all operations above board. Confidential transactions are apt to blow up later with considerable embarrassment for all. Travel is better postponed; the people you would go to see are not yet set for the visit." And in the golf world - at the Atlanta Classic, the first round leaders are George Knudsen and Jackie Cupit, 5 under par, 67 - that's the news; over.

SC Roger. (laughter) Thank you very much Jack. (laughter)

CC Oh, boy the way, Tom, I've got your astrocast here too. "Your natural tendency for moderate, sparse consumption serves you well. Your system is a little more sensitive to strange foods."

SC He's been eating like a horse for 4 days. He's the only one that saved us from the mylar - he ate it up.

CC Gene - I think you've got a pretty interesting forecast here too. Says for you, "Conditions are bewildering. There are so many odd and unfamiliar details. Just curb your impatience; question everything, and put things into place, one at a time."

SC Yeah, that is interesting, isn't it?

CC I guess so.

SC Thank you Jack. Just looking at that ole world in the optics; sure looks nice.

CC Apollo 10, Houston; we'd like to confirm that the ECS redundant component test is complete.

SC No Jack, it is not; we'll get it here immediately after the P52.

CC Roger, we're standing by.

SC I'll start on the secondary boilers right now.

END OF TAPE

PAO This is Apollo Control, a little over 12 minutes remaining until loss of signal on this 22nd lunar revolution. Continuing to monitor air-ground for any further conversation.

CAPCOM Apollo 10, Houston. When you have time we'd like to have some discussion on your earlier three questions about yesterday's activities, over.

SC Hello, Houston, Apollo 10.

CAPCOM Roger, go ahead, 10.

SC Okay, I talked to Jack Schmitt a time before the flight and on this pass if you'd like to correlate it, after I roll to 180 degrees there, and you can do that around the sub-solar point or before, if you've got Goldstone in configuration we can shoot you the tube for the vertical pass all the way down and maybe even shoot the solar corona at the end, over.

CAPCOM Roger, stand by.

CAPCOM Apollo 10, Houston. In order to have TV without comprimising photography and so forth you'll have high gain acquisition when you come AOS, but you should do your roll maneuver before 65 degrees east, over.

SC Roger, roll before 65 east. When are you going to correlate that time? Over.

CAPCOM Okay, we've already given you that on the vertical stereo pad. It's your T2 time of 120:20:11, that's 65 east.

SC Okay, and we'll have good high gain lock after that, right?

CAPCOM After 65 east you'll lose it, over.

SC Roger, after 65 east we will lose it, huh? Yes, it's hardly worthwhile then to - we'll only be there for a few minutes. We'll hold off.

CAPCOM Roger, copy holding off.

CAPCOM Apollo 10, Houston. We're unable to copy your P52 torquing angles. We'd like you to read them down, over.

SC Would you believe we didn't copy them down? We figured you were reading them. I seem to recall a 3 and a 6, 3/10ths of a degree or something like that.

CAPCOM Roger, thanks.

SC I realize that's not what you're looking for but it wasn't bad.

CAPCOM Roger, we copy, John.

SC Hey, Houston, we're doing a - main regulator checks now.

CAPCOM Roger, copy.

END OF TAPE

CAPCOM Apollo 10, Houston, we think the unscheduled tube action would best come around rev 29, and we have a question about the LM acquisition lights after staging. Did John see the LM acq lights any time after staging? Over.

SC Houston, Apollo 10, talking about the big track light out there above the forward hatch. John saw it all the way, in fact, we had to turn it off for him at the end it was so bright. Over.

CAPCOM Roger, copy you saw it all the way.

CAPCOM And Apollo 10, Houston. Do you have any idea what may have fixed the VHF problem after undocking yesterday?

SC Yes, we had the same switched configurations again that was - thought it might be corona but there was no way for us to tell, but it was just unreadable before and after we undocked and squared away. We tried again and it was unreadable and we tried it one more time (garbled)

CAPCOM Roger 10, see you around the corner.

PAO This is Apollo Control. We have had loss of signal as Apollo 10 went around the corner, the back side of the moon on revolution 22. Next acquisition 120 hours 7 minutes ground elapsed time revolution 23. During that pass, after the crew had completed the oblique strip stereo photography over landing site 2, they were read up a consumables update from the ground, flight plan update with one minor addition further on in the mission. They were given the revolution 23 TEI pad, which would be just a contingency batch of number to use for ignition of transearth injection burn if it became necessary. They were also given times for vertical stereo strip photography coming up this next revolution, the terminator to terminator strip photography taken with the camera pointing vertically to the lunar surface beginning at 65 - running between 65 east longitude and 34 degrees east longitude, pointing the camera somewhat north of the track to include landing site 1. Some 44 minutes it looks like until next acquisition. That must be an error, apparently, the clock has not been set after this last LOS, and at 119 hours - now we're getting a new time for next acquisition, 120 hours 7 minutes through Madrid for next acquisition of signal, and at 119 hours 24 minutes ground elapsed time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 120 hours, 7 minutes Ground Elapsed Time. Apollo 10 is within some 21 seconds of being acquired as it comes around to the visible face of the moon on lunar revolution number 23. Standing by for the first contact and they have the strip photography probably underway at this time. They may be rather busy and will not have a whole lot to say. As soon as we do have acquisition and conversation does begin we'll come up with that. One hour and 11 minutes in this pass until loss of signal.

CAPCOM Apollo 10, Houston standing by.

PAO This is Apollo Control. Spacecraft communicator Jack Lousma has called the crew, said he's standing by. We've had no response yet from the crew. We'll continue to leave the air-ground circuit live for any possible conversation during this revolution. Several items of information are scheduled to be passed to the crew during this rev but at the present time they're likely quite busy in conducting the photography task from terminator to terminator.

PAO We'll open the circuit and let it run until conversation commences even though there's a great deal of background noise, so that no conversation will be missed.

PAO This is Apollo Control. Snoopy, the ascent stage of the lunar module, is now some 36,875 nautical miles outbound from the moon, going toward solar orbit, traveling at some 5,356 feet per second. Flight Controllers who have been monitoring the lunar module are packing up at this time. As a matter of fact, the console is vacant now. They are abandoning the ship as their job is complete. Background noise has dropped somewhat in the air-ground circuit. We'll come back live with that now to pick up conversation during this 23rd -

END OF TAPE

PAO - background noise has dropped somewhat in the air-to-ground circuit. Come back with that live now, to pick up conversation during this 23rd lunar revolution.

CAPCOM Apollo 10, Houston, standing by.

SC Roger, Houston. We're taking our vertical stereo photography now. We just rolled past the subsolar point and -

CAPCOM Roger, 10, we copy.

SC Hey, Jack, now that we've got some time to pick out, really concentrate on this stuff, we're finding all kinds of features. It's mostly been on the tape but I hope you will be able to get the tape and play it there.

CAPCOM Roger. While we're talking about the tape, we've been getting on the playback some weak voice and background noise and we found out on a prior flight that it comes out a lot better if you make sure you have the mike real close to your mouth when you talk into the tape recorder, over.

SC Roger. Is that for all of us?

CAPCOM That is affirmative. All of you who were talking to the tape recorder.

SC We're now yawing left 20 degrees.

CAPCOM Roger, 10.

PAO This is Apollo Control. While we are waiting for the crew to complete the strip photography session, we have one local note of interest for newsmen here covering Apollo 10. At 1 pm Houston time, Mr. Ray Zedekar of Flight Crew Support Division will cover the lunar exploration time lines for the Apollo 11 mission, scheduled now for July. This will be in the main auditorium at the Manned Spacecraft Center. We return now to monitoring the air-to ground loop.

PAO This is Apollo Control. Some 5 minutes remaining in this vertical stereo sequence. The cutoff time at which they reach 34 degrees East lunar longitude will be 120 hours 30 minutes 18 seconds, a little less than 5 minutes from now. Likely there will not be too much conversation until after this stereo task is completed. Still monitoring air to ground live.

END OF TAPE

SC Houston, Apollo 10. We've just passed over Mount Marilyn and the crater Weatherford, over.
CAPCOM Roger, we copy.
SC Yawing right 20 degrees to pick up landing site 2 now.
CAPCOM Roger, 10.
SC And we're right on top of Maskelyne at this time.
CAPCOM Roger, 10.
SC Over Maskelyne B now.
CAPCOM Apollo 10, Houston. Say again, please.
SC Roger, we're just past Maskelyne B and I'm right, looking straight down at Sidewinder Rille, coming up to the head of Diamondback Rille.
CAPCOM Roger, we're following you.
SC Sabine is on the left. On my left as you go backwards. There's Faye Ridge.
CAPCOM Roger, 10. We observe you're liable to get sunlight on the windows here pretty soon.
SC Roger.
SC Taking US 1 on the right.
CAPCOM Roger.
SC We've got Moltke our my right window. We're right over the landing site 2.
CAPCOM Roger, copy.
SC And there's landing mark 130.
CAPCOM Roger, land marker.
SC And Langrenus is quite a majestic crater with a tremendously beautiful central peak. One that we were just able to look at at sunset the other day is just beautiful today.
CAPCOM Roger, Geno, 9 minutes and you have to speak up a little louder, please.
SC And I see crater 133 with that little crater we talked about on the right of it for tracking.
CAPCOM Roger.
SC We have a beautiful panoramic view looking back from Sabine and Ritter over the landing site and back to Maskelyne A and B and then over past Mount Marilyn there.
CAPCOM Roger, Tom.
SC I'll tell you, later on today, we'll talk about it when you have a chance for a rev, we may just go to a vertical strip roll 90 degrees so you can get high gain and we'll shoot the tube on it because I know it will pick it up and you can pick out all these features, over.
CAPCOM Roger, Tom, we'll start thinking about that.

END OF TAPE

SC - also you might tell Jack that we couldn't have a better crater named after him because we are looking at him now back from Sabine and Ritter and the boulders that have been kicked out of it on the outside slope nearly look like a forest of pine trees, there is so many big, black boulders there.

CAPCOM Say again the name of that, Tom.

SC It's really spotted the countryside with them. That's what we code named it, Herr Schmidt.

CAPCOM Roger. He says thanks, but it's - spelled the name wrong.

SC Well, we were in a hurry anyway. We didn't have too much time to worry about details. It looks just like a scattered - about the same thing as pine trees up on a mountain ridge. That's about what these big black boulders look like.

CAPCOM Roger.

SC We're now in an area that is really noticeably marked by volcanic activities. We have all kinds of lumps here and you can really see there is just thousands of volcanoes here, just a tremendous volcanic field, over.

CAPCOM Roger.

SC Lots of volcanic mounds.

CAPCOM Roger. That makes the geologists happy.

SC I've got one interesting site here. Looks like a - it's probably too dark to take a picture, but you can see where you've had a big impact crater with the rimmed edge. It looks like a stream of volcanic material has run over into it.

CAPCOM Roger, Tom. If you went to 1/25th on the Hasselblad, you might get it.

SC Yes, we've got 1/25th now. It's getting awful dark here. We've got a lot of sun on the windows, it's pretty bad.

SC We shot the whole strip. Sure hope we got you some good data. We got it in the sequence camera at 1 frame per second, color all the way through, and we got the Hasselblad all the way, too. Over.

CAPCOM That's great.

CAPCOM Apollo 10, Houston. If you're going to fly the next vertical strip photography, namely in rev 31 in that same attitude, why then we can give you the TV, over.

SC Okay.

SC Did you have high gain lock on us that time?

SC Say again.

CAPCOM Affirmative. We had it most of

the way and if we can confirm that you will fly in the same attitude in rev 31, why TV will come through all right.

SC Yes, we will fly the same one and at the last you get a tremendous view looking back over landing site 1, as you come over landing site 2, looking over the maria area. It's just fantastic. We will try to show it to you.

CAPCOM Roger, we will plan on it for rev 31, then.

SC All right.

END OF TAPE

SC And the sun went down and we had the solar corona.

CAPCOM Roger 10.

CAPCOM And when you get things put away up there we've got 3 pads and state vector update for you and a couple more discussion type questions.

SC Okay, if you want a state vector update we're in POO and (garbled) you the computers.

CAPCOM Okay, 10, we're ready for the update when you are ready.

SC Roger, go. (garbled)

SC Go ahead Houston.

CAPCOM Apollo 10, Houston. We're ready with the state vector update when you're ready it's your trip.

SC We're POO in accept.

CAPCOM Roger, POO in accept.

CAPCOM Apollo 10, Houston. Our signal strength is going down. Could we get omni charlie for this please?

SC Okay, I'm going to roll 180 degrees in just a minute.

CAPCOM Roger, we'll wait.

SC Houston, give me map update.

CAPCOM Okay, Apollo 10, Houston, I've got a map update for you. Rev 24: LOS 121:19:59, 1213111 1220609 Sunrise is 121:33:30. Sunet 122:45:55. Read back, and I've got eh landmark tracking pad after that.

SC Roger, 1211959,1223111 1220609 1213330 1224555. Rev 24.

CAPCOM That's affirmative. Are you ready for your tracking update?

SC Go, over.

CAPCOM Okay, Charlie Papa 1: 1213949 1214249 3 balls, 050 3 balls, north 13 miles 1140. Charlie Papa 2: 1215510 1215652 3 balls 2 balls 8, 3 balls, north 050440. Fox 1: 1220755 1221006 3 balls 326 3 balls north 100941. Number 130: 1222903 1223037 3 balls 265 3 balls north at 13 1240. Go ahead, and I've got a maneuver pad after that.

SC Roger, Charlie Papa 1: 1213949 1214249 all balls 050 all balls. North 13 1140. Charlie Papa 2: I missed G-1. Over.

CAPCOM Roger, on Charlie Papa 2 we had 12155 and 10, and we want to confirm the nautical miles on Charlie Papa 1 as being 13, 13. Over.

SC Roger, 13 north. Okay, Charlie Papa 2: 1215510 1215652 all balls 008 all balls. North 050440 F-1: 1220755 1221006 all balls 326 all balls. North 100941. 1220903 1223037 000 265 all balls North 13 1240.

CAPCOM Roger, you got it, and we're ready with the maneuver pad.

APOLLO 10 MISSION COMMENTARY, 5/23/69, GET 120:47, CDT 1236 422/2

SC Go ahead, Jack.

CAPCOM Okay, this is TEI 24: SPS G&N 36818 minus 061 plus 076 123 40 5233 plus 30443 plus 00131 plus 00682 NA 066 and the rest is NA. Under ullage 2 jets for 14 seconds. Over.

SC Jack, we had an antenna switch right in the middle of all that, you'd better start it over.

CAPCOM Apollo 10, Houston. Before we proceed let's lock up with the high gain. Over.

SC Okay, we're still maneuvering. Stand by on it.

CAPCOM Roger.

SC Hello Houston, this is 10. We're in accept and POO and ready for your update and ready for your pad.

CAPCOM Roger, 10, reading you loud and clear now. The uplink is coming up and here's the pad:

END OF TAPE

SC Hello Houston, this is 10; we're in ACCEPT and POO and ready for your update - ready for your pad.

CC Roger 10. Reading you loud and clear now. The uplink is coming up and here's the pad. TEI 24, SPS G&N, 36818 minus 061 plus 076 123 40 5233 0, correction, plus 30443 plus 00131 plus 00682; roll is in A, pitch is 066. The rest is NA. Your ullage is 2 jets for 14 seconds; over.

SC Okay, Jack. I got TEI 24, SPS G&N. 36818 minus 061 plus 076 123 40 5233 plus 30443 plus 00131 plus 00682 NA and pitch is 066, the rest is NA; 2 jets for 14 seconds.

CC That's affirmative.

CC Aollo 10, Houston; the uplink is complete; computer is yours; you can go to block. And we noted that on the last pad during the strip photography you were rolled 180 degrees different than what we expected you to be. And we'd like to ask you a couple of questions about the LM S band yesterday and LM pressurization when you have an opportunity to discuss it; over.

SC Go ahead Jack.

CC Okay, on the S band communications around the DOI period - do you have anything significant to report having loss comm for about 20 minutes on the high gain there we were a little concerned as to what the problem might be there - can you discuss that?

SC No, but we were having lock out problems as we went low across the landing site; it appeared that it occured right in our low time and the S band didn't track; didn't follow us when we were across the landing site, and I went to OMNI's OPEN without having too much time to play with it - and then for a period of time after that I played with the S band again and was able to acquire you on lock on - that's all I can really say, but it did occur somewhere near the low part of our trajectory.

CC Roger; we understand. Another question is regarding the LM pressurization. We noted that right after you took ole Snoopy off of Charlie there, that the LM cabin pressurization went down; do you - did you observe anything or note anything unusual about that, over.

SC Jack, he moved away with a blast, and and the next thing we had in our eyes was the sunlight right through the window and we couldn't see a thing. I do know that both dump valves were in AUTO however, we had a lot of garbage around after the blast from the pyro's but other than that, Tom may have seen something else -

STAFFORD I was looking out the center hatch window and as you know, we couldn't get the tunnel de-pressurized and when we fired those pyros, some more insa-lation blew out and I just saw Snoopy disappear in a big snowstorm going straight up into the sun and that was all. Over.

CC Roger, thank you. And last time we saw Snoopy down here, he was 37 000 miles going straight up from the moon at 5400 feet per second, and thank you for your comments; over.

SC Okay, and the - okay. I guess I got right ahead - we made some changes in here on that roll.

CC Roger; we noticed.

SC And the way that the times have changed. But - I'm sorry about that - but it didn't seem to - we didn't get any shafting or anything on our windows at all until right at the last when we hit the terminator.

CC Roger, that was the only thing we were concerned about.

SC Yeah - I don't think - there was no shafting at all on the windows and it looks like we were giving our comments and I don't think we had any problem at all.

CC Roger - thank you for your comments; they are good, and understand we will have this attitude for rev 31.

CC Apollo 10 Houston; we'd like you to check the situation with fuel cell 1, insure that your fuel cell 1 pumps AC circuit breaker and handle 226 is CLOSED. And that your fuel cell number 1 AC 1 is CLOSED - correction is AC one. Do you copy 10?

SC (static) (garble)

END OF TAPE

SC - okay, we just wanted a -
SC Hello, Jack.
CAPCOM Apollo 10, Houston. Do you read?
SC Yes, we read. I tried to push in breaker A and it's out and as soon as we did we got an AC buss 1 light, a main buss A and a main buss B undervolt light. The breaker will not reset at this time and it's fuel cell number 1, AC pump breaker on 226.
CAPCOM Roger. That's the one. We're looking at it.
SC Okay, when I push it in, I get those three lights, AC buss 1, main buss A, and main B undervolts.
CAPCOM Roger, 10, we're working on it.
SC Say, Houston, this is 10.
CAPCOM Roger, 10, we're working on this problem. Stand by, please.
SC Okay, I just wanted to tell you, of course, I just got - there goes the fuel cell 1 light. I just expected it. I think it's probably because of a condenser exhaust temperature down around 154 degrees. Also the skin temperature is going up at this time and we do have the fuel cell 1 light on. The bottom light is now rest and everything's normal from that. It's just fuel cell 1.
CAPCOM Roger, we copy and confirm.
CAPCOM Apollo 10, Houston. Here is what we would like you to do on fuel cell 1. Open circuit fuel cell 1, fuel cell 2 go to main buss A only, fuel cell 3 go to main buss B only, over.
SC Roger. You want me to open circuit fuel cell number 1, you want me to go fuel 2 to main buss A and fuel cell 3 to main buss B. I'll do it now.
CAPCOM That's affirmative. We're standing by.
CAPCOM Apollo 10, Houston. In the event that you get an undervoltage light, disregard the voltage and come right back up again.
SC Okay. I'm up to 26.9 on main A and main B at this time.
CAPCOM Roger, 10, we copy and it's looking good.
SC How good does all that look to you?
CAPCOM Say again, 10.
SC All I said was how does it really look to you?
CAPCOM We're assessing it right now.
SC Okay. I guess we're going to lose you in a couple of minutes here.
SC Houston, this is 10. Do you want

me to maintain my battery charge on A at this time?
CAPCOM Apollo 10, Houston. Terminate your battery A charge and if we get a cryo 02 heater cycle, you may lower the buss voltage momentarily, over.
SC Okay, fine. I understand I'm to terminate the battery A charge at this time.

END OF TAPE

SC Okay, fine. I understand. I'm terminating the battery charge at this time.

SC Houston, do you have a - what's your latest hack on when will have AOS information, please.

CAPCOM Okay, AOS will be 122:06, and we'll be losing you in 2 minutes.

SC Roger. 122:06 and we're going to plan to continue on with the landmark tracking and we'll talk to you about this as soon as we get AOS.

CAPCOM Roger, we'll have some new words for you then.

SC Okay, thank you Charlie.

SC Okay, Houston, Apollo 10. I'm going to go ahead and start a roll around so I'll come around to ORB rate of 3 - I'll wait until after we get loss of signal and pick up the ORB rate at 39 for landmark tracking.

CAPCOM Roger, we copy.

PAO This is Apollo Control. We've had loss of signal from Apollo 10 as it went around behind the moon on the 23rd revolution. Our next acquisition of signal will be at 122 hours 6 minutes ground elapsed time, some 5 minutes and 40 seconds from now. Apparently one of the 3 Apollo fuel cells is acting up somewhat, and by shifting the switch positions in the spacecraft powering the main busses and the power distribution system they are getting around this slight anomaly. On the next revolution around the moon they will be conducting some orbital navigation exercises, landmark tracking, and at 121 hours 21 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 122 hours 5 minutes ground elapsed time, less than a minute away from acquisition here as Apollo 10 comes around from behind the moon on revolution 24. This next loss of signal will be some hour and 12 minutes from now at 123 hours and 18 minutes. We're standing by for a resumption of communications here as the spacecraft comes around on this rev. The crew at the present time is tracking various lunar landmarks and lunar orbital navigation experiments. We should have acquisition of signal at the present time.

PAO Standing by here for the first call from the spacecraft or from the ground to Apollo 10.

CAPCOM Apollo 10, Houston standing by.

SC We're right square in the middle of a landmark tracking.

CAPCOM Roger, and we've cranked up a plan of attack on that fuel cell.

SC Okay, can you hold off for just a couple of minutes? We'll be right with you.

PAO Apollo Control here. The crew is still rather busy in the landmark tracking exercise and a few minutes ago asked Spacecraft Communicator Jack Lousma for a few more minutes to complete this particular run before they picked up with the discussion. We will leave the circiut up, though, and pick up the conversation when it does resume.

SC Okay, Houston, Apollo 10. Go ahead with the clean up 1 and 130 on the sites.

CAPCOM Okay, Tom, here is our plan of attack on our fuel cells. First, we're going to look at the fuel cell temperatures for a little while and after we've done that we're going to put it back on line to look at the temperatures it generates versus it's loading, and then we're going to work up a fuel cell purge. We've got 25 hours of hydrogen purging available. Looks like we've lost a pump back in that fuel cell 1, but we're going to maintain the temperatures of the fuel cell by purging it, and then we'll use the cell only for burns etc. At the present time, we're not proposing any changes in the flight plan, and we expect when it goes back on line it will go on both main A and main B, and so at this time we're working up a purge cycle and looking at your fuel cell. Over.

SC Okay, we'll get that checked.

SC Okay, Jack, we did when the heater cycled - we were looking at about 20 to 20.2 volts and we've got the main bus voltage underolts light and cycling the heaters to the auto position on the cryos, one at a time. It's just not a good feeling to have those lights under-volts lights go on in here. I've also temporarily turned the power on the high gain antenna off until we can catch a high gain count.

CAPCOM Roger, we copy.

SC And we've also turned the potable H2O heater off, just some other small things to start saving power.

CAPCOM Roger, high gain antenna and potable water heater.

SC So, Jack, if you see my cryo pressure dropping, don't hesitate to tell me to get the heater on. I just don't like to put all 4 of them on. We split the load when we get the lights on.

CAPCOM Roger, understand you're cycling your cryo heater -

END OF TAPE

CC - the potable water heater, OFF.
SC So Jack, if you see my dial pressures dropping don't hesitate to tell me to put the heater ON ... put the load lights on.
CC Roger; understand you're cycling your cryo heaters and we'll watch the temperature.
SC Thank you.
PAO This is Apollo Control here; 53 minutes remaining until loss of signal on this 24th lunar revolution; continuing to stand by for resumption of communications between Apollo 10 and the ground.

END OF TAPE

SC Houston, Apollo 10. We've just finished tracking landmark 130.

SC Hello, Houston, Apollo 10.

CAPCOM Apollo 10, Houston. Go ahead.

SC Roger, we've just finished the landmark 130. We've got them all in.

CAPCOM Very good. We have ginned up a fuel cell 1 plan, over.

SC Okay, stand by.

SC Houston, 10. You got the data off 130?

CAPCOM Houston. Say again, please.

SC Roger, do you have the data off 130 yet?

CAPCOM Stand by. That's affirmative, 10. We've got the data off 130 now.

SC Okay, when we're at real time I'll just hold on. I understand this is the one that's real important, so I can hang on to this until you give me a go.

CAPCOM Roger, that's fine and we got it now.

END OF TAPE

SC - really important, and so I can hang onto this until you give me a go.

CAPCOM Roger, that's fine. We've got it now.

SC Go ahead, Houston, this is 10, with your fuel cell plan.

CAPCOM Okay, our fuel cell plan is relatively simple. We're just going to leave it off line, open circuit and we want you to turn fuel cell 1 inline heaters off and then monitor the skin temperature. Monitor the temperature to stay between 390 and 410, cycling the inline heaters on and off to maintain 390 to 410. This will keep our water production to a minimum, reducing our requirement to purge and we may be able to go as long as 50 hours in this manner without purging. During the day we will work out procedures to use during you sleep period on skin temperature, over.

SC Okay, Jack, you must have been reading the same malfunction procedures I was. The fuel cell heater has been off now ever since we went through LOS.

SC I've got a question on the heater. It's an auto heater, which recycles somewhere around 380, 390 degrees. Do you just want me to put it to auto position if it starts dropping, is that correct?

CAPCOM Negative, 10.

SC - we were wrong about that heater.

CAPCOM We want you to manually keep the temperature between 390 and 410 by cycling the heater switch, over.

SC What are you reading on the heater, the skin temperature right now?

CAPCOM Stand by.

CAPCOM Right now, we're reading skin temperature of 423, 10.

SC Okay, I'm reading about 430, I guess, and it's been pretty stable. I'll turn the heater on - down about 390 and keep it between 390 and 410.

CAPCOM Roger. And when you've got some time there, we would like to update your state vector and pass you some pads.

SC Okay, we're in accept.

CAPCOM Roger, 10.

SC Okay, I'm ready to copy your pad and I guess I've got another question. You might be thinking up some words and things we can pull off the line here pretty quick in case we do get the maneuver problems along behind the backside and I'm ready to copy your pad.

CAPCOM Roger, we're working on that and we will give you the word. I have a map update pad, rev 25.

123183212329 -

SCH Hold it there. Wait a minute, wait a minute, hold it, hey. Jack, wait a minute, wait a minute Jack. I thought you meant a pad. Wait a minute, we've got to get the right book out there. Hold it. Start all over again.

CAPCOM Roger. I have a maneuver pad.

SC Go ahead with rev 25.

CAPCOM Okay, rev 25. 1231832123293612404 21 sunrise 1233214, sunset 1244439, over.

SC Roger. 123183212329361240142123321 4 124439, rev 25.

CAPCOM Roger. Want you to check the AOS to be 1240421, sunset 1244439.

SC I concur.

CAPCOM Okay, I've got a landmark tracking pad.

SC Go ahead.

CAPCOM Okay, charlie papa 1 12338141234113 three balls 051 three balls north 13 miles 1241. Charlie papa 2 12353351235517 three balls 007 three balls north 0504 42, foxtrot 1 12406201240830 three balls 329 three balls north 101040. Landmark 13012427281242900 three balls 265 three balls north at 121241. Give me a readback and tell me when you are ready for a maneuver pad, over.

SC Roger. CP112338141234113 all balls 051 all balls north 131241. CP2 12353351235517 all balls 007 all balls north 050442. F 1 12406201240830 all balls 329 all balls north 101040. 13012427281242900 all balls 265 all balls north at 121241.

CAPCOM Readback correct.

SC Ready for the pad.

CAPCOM Okay, this is TEI number 25. SPS G&N 36750 - 061 + 075125400381 + 31008 + 00112 + 01154 roll is NA, pitch is 064 and the rest is NA. Your ullage is two jets for 14 seconds, over.

END OF TAPE

CAPCOM 1154 roll is NA, pitch is 064 and the rest is NA. Your ullage is 2 jets for 14 seconds. Over.

SC Roger, TEI 25, SPS G&N 36750 - 61 plus 075 125400381 plus 31008 plus 00112 plus 01154. Roll is NA, pitch is 064 and 2 jets for 14 seconds.

CAPCOM Roger, that's a good read back and we're finished with our uplink, the computer is yours, go to block. Over.

SC Okay, we're in block.

SC Houston, this is 10, that F-1 was right near the subsolar point and boy I really had a lot of trouble trying to figure out (garbled) You could see it okay in the telescope but when you transfered it from the telescope to the sextant it just dashes.

CAPCOM Roger, 10, what target was that?

SC F-1.

CAPCOM Roger, F-1.

SC LP-2 is sort of that way, too.

CAPCOM Roger.

SC Okay, Houston, Apollo 10. I'm going to pitch around and go to 092 inertial.

CAPCOM Roger, 10.

SC It doesn't vanish, it's there but you just can't see it. That sounds kind of funny. It's got the landmark in there, landmark line of sight and the lunar line of sight in there all in one in the sextant and you've got 2 different images and they're so bright it just doesn't - unless it has the dark feature in it, which most of these places don't. You just didn't recognize them.

CAPCOM Roger, 10, understand it's hard to see because it's bright as opposed to its size. Is that affirmative?

SC That's correct.

SC I just don't get any definition. It's a bright log down there and a whole bunch of bright logs down there.

CAPCOM Roger, copy.

CAPCOM Apollo 10, Houston, John wherever you have a target that looks too bright in the sextant we recommend plugging in the telescope and using it that way. Over.

CAPCOM Apollo 10, Houston, how do you read?

CAPCOM Apollo 10, Houston, standing by. Over.

SC Roger, we're getting squared away now to a better IMU align attitude. Over.

CAPCOM Roger, and I'd like to tell John that he can use the telescope where necessary if field of view in the sextant is too bright.

SC Okay, I'm standing. 130 is no problem, that's easy to get, so I used the sextant on it, but maybe on F-1 and CP-2 I'll use the telescope.

END OF TAPE

SC Okay, outstanding. 130 is no problem; that's easy to get. I used the sextant on it but maybe on the F-1 and GP2 I'll use the telescope.
CC Roger - go ahead and use that telescope if its too bright to get in the sextant.
SC Boy - whoever thought of using the telescope on landmark tracking.
CC Say again 10.
SC I was just making a facetious remark
CC Roger; thats what I thought. And they'll buy the telescope data. And we'd like to have the high gain antenna for dump; over.
SC Okay Jack. Houston, this is 10, can you give us some -
CC Apollo 10, Houston; say again please.
SC Could you give me some high gain angles please, for my attitude?
CC Stand by.
CC This is Capcomm.
SC Go ahead Houston.
CC Apollo 10, Houston; if you haven't found them already; its pitch minus 70, yaw 192; over.
SC Rog - I got them, Dick. I'll be with you in a minute. Houston, you got us now?
CC Hello there, Apollo 10, Houston is reading you loud and clear; we're gonna start the dump.
SC Okay, she's all yours.
CC Roger and your LOS will be at 123:18, about 17 minutes; and we owe you a power down list.
SC Roger; will you have it by then; over.
CC If we don't, we'll find out why.
SC Okay.

END OF TAPE

CAPCOM Apollo 10, Houston. We have some information on potential power-down items, over.

SC Stand by.

SC Okay, Jack, go ahead.

CAPCOM Okay, if you don't want to interfere with tracking and photography operations there's not much more that you can power down that you've not already powered down; however, if you elect to terminate your tracking and photography operations, refer to checklist page F 2-8 which is power down SPS burn. Start at the top and start powering down those items. However, do not power down batt C. Delete batt C on main A and B from the checklist and delete fuel cell pumps 3 off. Delete those two items and use the power down checklist as your guide, over.

SC Okay, Jack. Yes, I was looking at that. I guess what I was looking for was some word on - not on emergency power down, but, you know, in case this (garble) comes on and persist to stay on, there might be a few other little things that we've overlooked, like I'm playing these heaters manually. We turned the portable heater off and turn the S-Band off when we lose you, and a few of those things. I wasn't looking for any emergency conditions, that maybe a few good words or something that would be very obvious to you but not to us.

CAPCOM Roger, you've already done a pretty good job of figuring that out, Gene.

SC Okay, we thank you.

SC Okay, Houston, Apollo 10. Just keep us informed because this landmark tracking is real important. We get this (garbled) down and we've already got one set and we're going to continue on here and we'll (garble) this cell and naturally, if the thing really starts to go out on us we know what the mission rule is on it. But right now we plan to continue on and primarily concentrate on the landmark tracking. We've shot so much photography we're about out of color film. We're saving a little bit for the way back. And we still have some black and white to go and we'll do some of that but the main thing we're going to concentrate on now is the landmark tracking, over.

CAPCOM Roger, Tom. We see no reason to change your plan of attack, and we have a change to landmark tracking update pad Foxtrot 1, over.

SC Okay, stand by and I'll copy. Okay, go ahead.

CAPCOM Okay, on rev 25 target Foxtrot 1, the T2 time should be changed. T2 should be 124:08:03.

SC Okay, I got that. 03 vice 3 zero.
CAPCOM Roger, that's affirmative and so far all the tracking data looks real good.
SC Roger, thank you. Have you got a pretty good way to evaluating real time there? Over.
CAPCOM That's affirmative.
SC I didn't get all the marks on one of those places because I lost it in the sextant.
CAPCOM Roger, we copy, 10.
SC I forget. It's one of the CP's back there. It's not one. It's CP2.
CAPCOM Roger, we detected that on CP2 but 130 is the real important one and that's coming through real good.
SC Roger, thank you.
CAPCOM Apollo 10, Houston. We have a revision to the way in which we like you to maintain temperature in the cryo tanks, over.
SC Okay, Jack. Go ahead.
CAPCOM Roger. Instead of using your heaters to maintain the temperature in the cryo tanks, use your fans manually, over.
SC Okay. Use the fans to maintain the pressure in the cryo tanks, right. Is that correct?
CAPCOM Use the fans to maintain the temperature in the cryo tanks. This will be - correction pressure. This will require less current and allow finer control, over.
SC Very good. Thank you. Those are kind of good words I really wanted. Thank you very much.
CAPCOM Roger, we'll try to think up some-more.

END OF TAPE

PAO This is Apollo Control at 124 hours, 31 minutes. There has been very little air to ground conversation during the change of shift news conference. The crew has been busy with the landmark tracking test. We'll play the tape of the conversation that has taken place and then stay up live through the remainder of this pass. We have about 44 minutes of acquisition time left.

CAPCOM Hello, Apollo 10, Houston. We're standing by. Over.

SC Roger, Apollo 10, Houston. We're doing landmark tracking, and we're coming up to the landmark F1.

CAPCOM Roger, 10. Good afternoon, you guys. Just wanted to congratulate you on a great day yesterday. I didn't get a chance to do it yesterday. It was a beautiful show.

SC Okay, thanks a lot, Charlie. You on the ground really came through coordinating those vehicles together. You must have had a heck of a load on your shoulders, but it was fantastic, and we sure appreciate it.

CAPCOM We've had a lot of fun.

SC (garbled)

CAPCOM Say again, John.

SC I could feel - I could feel the tension down there all the way up here.

CAPCOM We were a little tight at times, but you guys did a great job. We'll let you get back to work now. Out.

SC Rog. Thank you.

SC Got the data, Charlie?

CAPCOM That's affirmative, John. We got it all. Over.

SC Houston, Apollo 10. Did you get the data? Over.

CAPCOM Roger. We got the data. Over.

SC It looked okay in the telescope this time.

CAPCOM Okay.

PAO That's the end of the tape, and we're live now.

SC Hello, Houston, Apollo 10.

CAPCOM Go ahead, 10. Over.

SC I'm going - okay, I'm going to pitch around to the 092 attitude, and we'll get you some high gain then. Over.

CAPCOM Roger, 10.

SC Houston, this is 10. Summary of the last 4 landmarks, CP1 - I'm not sure reviewing it in my mind whether I tracked the same CP1 on the first one as I did on

SC the second one. CP2, I'm sure I've got the right one, F1 I'm sure is the right one, and 130 I'm sure is right.

CAPCOM Roger, Tom. We copy, maybe not sure on CP1, the rest is the same.

SC Yeah, and CP2 I did with a sextant, CP1 and 2 with a sextant, F1 was with a telescope, 130 was with a sextant, and I'm going back to the telescope on CP1.

CAPCOM Rog.

SC And probably CP2.

CAPCOM Roger, we copy, John. Next rev you're going to try the telescope on CP1, 2, and F1 and use the sextant on 130.

SC Rog. And I may not do that. It depends on whether I can identify it in the sextant once I get it in the scope.

CAPCOM Roger. We copy. How's the old eyeball holding out.

SC Eyeball's okay. I just keep - I just keep - it's a question of washout and things like that. At different inclination angles when you're passing over, these little things look different, especially in that sextant where you've got these 2 landmark line of sites. These two lines of sites are sort of in competition with each other.

CAPCOM Roger.

SC 130's been good, though. 130's been real good.

CAPCOM Roger. Thanks alot. Out.

CAPCOM 10, Houston. About 15 minutes before LOS. We'll have a low critique when we look at the data, and we'll talk to you a little bit more then about it. Over.

SC Rog.

CAPCOM Hello, 10, Houston. We'd like to go to POO and accept. We've got a state vector for you. Over.

SC POO and accept. Go.

CAPCOM Roger. And 10, if you're ready to copy now, we got a CEI 26 pad for you.

SC Go ahead, Charlie.

CAPCOM Rog, Gene. PEI 26 SPS G&N, N/A down to noun 33, then we got 127392000 981 plus 31638 plus 2 balls 560 plus 01601, pitch angle is 062, and it's 2 jet ullage for 14 seconds. Over.

SC Charlie, we lost you. I picked you up at 981. You'll have to go up to - up to 981 again.

CAPCOM Roger 10. Why don't we hold off till we get the high gain, and we'll be back with you. Over.

SC Okay, fine.

SC Go ahead, Charlie. We got your high gain now.

CAPCOM Rog, 10. You copy now, Gene? Over.
SC That's affirm.
CAPCOM Okay, we were N/A down to noun 33. Noun 33 is 127392000 plus 31638 plus 00560 plus 01601 and a 062 on pitch angle, 2 jet ullage for 14 seconds. Over.
SC Okay, I got PEI 26 SPS G&N, noun 47 and noun 48 are N/A, 33 is 127392000 plus 31638 plus 00560 plus 01601. Pitch is 062 and 2 jets for 14 seconds.
CAPCOM Rog. That's a good readback, 10. And we have a rev 26 update for you. Tracking in the map update if you're ready to copy that now.
SC Okay, go ahead, Charlie.
CAPCOM Okay, we got the state vector in, Gene, and you can go back to block. Okay, the map update for rev 26 coming at you, 1251641 1252800 1260251. Okay -

END OF TAPE

CC Okay for the CP1, starting with T1, 1253638, 1253938, 000052000, north of track 141241, going to CP2 now. And starting with P1, 1255200, 1255342 000007000, north of track 050443. You with me?

SC Go ahead, Charlie.

CC Okay. T1 time, 1260446, 1260629 000330000 north of track 101441. 130, Okay T1 for 130 1262553, 1262725000267000 north 121240 and that's all of pad. Standing by for your readback.

SC Okay, rev 26 is 1251641 1252800 1260251 TP1 is 1253638, 1253938, 000052000, north 141241, CP2 is 1255200 125342 000007000, north 050443. F1 is 1260446 1260629 000330000 north 101441. 130, 130 is 1262553 1262725000267000 north 121240.

CC Okay, 10, that's a good readback, Gene-o. Out.

SC Okay, Charlie, from what I saw a little while ago, it looks like the sun might be shining down there.

CC Yes. We've got a big growler coming up north of the site here. Since I came in, it might be raining out there.

SC Okay. That was with the naked eye from a quarter million miles away.

CC Your friendly geologist, Jack, just advised me that he just came in and summer has really arrived in Houston and it is clear and hot.

SC Very good.

END OF TAPE

SC Hello, Houston, Apollo 10.
CC Go ahead, 10, over.
SC Okay we are looking ahead of you. We've got this rev of landmark track and it calls for a TV pass. And I'd like to show you this moonscape out here. It's really -- we've even got some definitition of the color out there about being in the shade of light brown and light tan and it's gray right near the Smyth's set. an early sunrise and also the new craters look like a gypsum, more of a whitish, chalky - but after 1:30 there is not much light left. An ideal thing would be maybe right near the end of the -- best be would give you a big panaramic sweep coming in through there. How would that be? Over.
CC Roger. That sounds good to us. Understand that you would like to skip the regular TV at 1:26:20 and then schedule it at the end of the rest period. Over.
SC Yes, that's right. By the time we do that you have to give us a state vector, John does an IMU, and then we come around and do one more rev of landmark tracking. It's pretty crowded, plus I don't think we'd have too much to show you. We have to get squared away for the landmark tracking again, but the way that the sun is now, out on that Maria area there and everything, it is really beautiful and I think it would be lots better if you could figure out an angle where we could get high gain, we could be looking backwards. Unless we progress forwards, look back. Kind of show you the whole zone. Or we could go forwards so you can get a high gain angle during that rest period. We could take a about 15 or 20 minutes in there without any problem and show it to you. Over.
CC Roger, 10. We can come up with that for you. Do you want us to schedule this at the beginnning of the rest period or right at the end, Tom?
SC Stand by, Charlie.
CC It looks like to me - 10, it looks like to me at that time would probably be at the end of the rest period. You begin your rest period, you are already in darkness, starting rev 28. We could probably do it at the end of your rest period. At about 13130 or thereabouts. Over.
SC We were looking ahead here and this looks real good, Charlie. In other words, when we come around about 131, say 30 or so, give us the angles and we've got some beautiful panaramic views. If we can be looking out obliquely ahead down at about 15 or 20 degrees, and looking ahead with the sun to our back there

SC you should get a fantastic view of the whole Maria area. It's really beautiful. And we could show that on TV. At least so far the colors have been coming through good. Show - show you what we mean by color up here. Over.

CC Roger. Would you like to combine it with the oblique strip photography of landing site 3? Over.

SC Yes. That would be okay. Be fine.

CC Roger. I think we are pretty well squared away on that, Tom. We'll look at it a little bit longer and we can come up with an attitude for high gain and TV and allow you to get your oblique strip in there and we'll have it for you in a little while. Over.

SC Okay. Thank you, Charlie.

CC Hello, Apollo 10, Houston. Over.

SC Go ahead.

CC Okay, Tom, we've got a little critique on your rev 25 tracking for John. On site 130, it appeared that he started about 50 seconds early. The spacing was good, but the geometry was not quite------

END OF TAPE

CAPCOM - 50 seconds early. The spacing was good but the geometry was not quite as good as we'd like it and if we could just move that up 50 seconds we'd appreciate it. Go ahead, John.

SC Go COMM, we're listening for you. John is busy, go ahead.

CAPCOM Okay. The spacing was real good on the marks but the geometry wasn't quite as good as we'd like it so they just wanted to pass on that remark. On F1 the mark spacing was excellent and we started right on time. We only got 4 marks recorded and it appeared that we were in just - stand by. Roger, it appeared that on F1, that we initially was just in attitude hold and we ran out of trunnion before we got all the marks in but the spacing was real good, over.

SC Okay. Okay, we started the marks on 130 right on the times that - we though right on the times seat that you passed up to us, over.

CAPCOM Stand by, one. 10, Houston. The experts here were saying that the T2 time, the mark should be started about 30 to 40 seconds after the T2 time, over.

SC Okay, all right we'll start them 30 to 40 seconds after T2.

CAPCOM Roger, and Tom we're going to have Goldstone up for you on the TV in about 132 and we'll have the 210 dish and it looks like we're going to be in good shape for the oblique and the TV and we'll get all the info up to you next rev, over.

SC Okay, sounds real great, Charlie. Thank you.

CAPCOM Roger, and we got 10 minutes to LOS. We'll see you next rev at 12602 and we're looking good going over the hill. The fuel cell, everythings looking good, over.

SC Okay, real fine and thanks a lot, Charlie. Houston, this is 10. On that TV pass and like the obliques, if we could get into some attitude we wouldn't have to be upside down, like maybe we'd be yawed right or pitched and looking out a side window, over.

CAPCOM Roger, stand by on that one, Tom. Over.

SC Okay.

CAPCOM Hello, 10. Houston. We have your request and we'll work it out on the back side and we'll have it for you next AOS, over.

SC Okay, real fine, Charlie. Thanks a lot. It looks like the old orbit here is being torqued around just like predicted. Apogee is getting higher and purge is getting lower, over.

CAPCOM Yeah, old fido's been showing me what the potential does to you guys there. That's a really wierd looking thing there. It's as predicted though I guess I'm - go ahead.

SC I was just going to say. We've been noticing, we expected it but we're in the 67.3 by 54.7 looks like total energy is conserved but it's really changing the APS by there, over.

CAPCOM Roger, that's just about what we have you in. We agree with all those comments, over.

SC Roger.

CAPCOM Hello 10, Houston. 2 minutes to LOS. You're looking great going over the hill, over.

SC Okay, Charlie. Thanks a lot.

PAO This is Apollo Control at 125 hours, 16 minutes. We've lost the signal from Apollo 10. We're showing an orbit here now of 67.3 by 54.4 nautical miles. The previous revolution we were reading 67.1 by 54.7. This was a busy pass as far as the crew was concerned doing a lot of landmark tracking. We updated the crew on times and attidues for control points and landmarks and up coming revolutions. As you heard the discussion, the regularly scheduled TV pass which had been scheduled for an elapsed time of 126 hours, 20 minutes has been scrubbed and in its place we'll be a television pass beginning at Goldstone acquisition at 132 hours. At that time we'll be in revolution number 29. We have acquisition again of Apollo 10 at 126 hours, 2 minutes, 51 seconds. This is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 126 hours, 1 minute and we are 50 seconds away from acquisition of Apollo 10 on the 26th lunar revolution. We will stand by live during this acquisition time.

CC Hello, Apollo 10, Houston. We're standing by.

SC Hello, Houston, Apollo 10.

CC Go ahead, 10.

SC We've been delaying a little bit like you suggested about that T2 time, but the thing gets just about out of sight. Dear John had to hurry up on the last one, so we've been waiting about 20 seconds and that's about it after the T2 time.

CC Roger, 10. We copy. Sure that's okay. That sounds good. And little run down on your CP1 and CP2 marks on rev 25. They looked real good to us. The marks were good and the spacing was good. We are real happy with that. Over.

SC Okay. Real fine and just might pass along to the Fido troops down there that we noticed a star we could not identify coming up and said there must be something else in orbit with us and sure enough on this last pass it got close enough. It's the bottom part of Snoopy and Geno with his monocular could see his legs - the reflection off his legs. As he went out in behind us, like, I guess I read that one straight, he came out and he said we're going to slowly catch up with him. Well, we're starting to catch up with the bottom part of Snoop, but something is torqued him out of plane a little bit and he's going out of plane into the south of us. Maybe a MASCON grabbed ahold of him, or something, but we're catching up with him. There's no doubt about it. And we can actually see the different colors in the reflected light off the black in the silver panels. Over.

CC Roger. Good show. We'll pass that on to the Fido.

SC Got the data there, Houston?

CC Stand by. We got it all. You can proceed.

CC 10, Houston. You can increase your marking time slightly and if you will push your PITCH rate up a little bit, as you go through the marking cycle. Over.

SC Okay. Yes, we thought about that.

END OF TAPE

SC Okay, flight. Let's pay attention to business now. Garbled.

PAO This is Apollo Control at 126 hours, 20 minutes to repeat an earlier announcement. The TV transmission scheduled for this time has been postponed. The crew is busy with landmark tracking. This TV transmission has been rescheduled to 132 hours elapsed time on revolution number 29. We'll continue to stand by live.

SC Houston, that completes 5 marks. We had exactly 30 seconds between the marks, over.

CAPCOM Roger, 10. We copy.

SC Houston, this is 10. Do you want me to go ahead and pitch over before we give us the update and go ahead torque a little bit.

CAPCOM Stand by. Hello, 10. Houston. You can go ahead and maneuver and give us the high gain then we'll give you the update after that, over.

SC All righty. You got the data, Charlie.

CAPCOM Stand by. We got it, 10. You can proceed.

SC Okay, pitching over. Houston, Apollo 10, over.

CAPCOM Go ahead, 10. Houston.

SC Roger, on that last pad, I'm sure the same TP1 I marked off with the sextant on rev - on the first - on the second tracking rev, I marked on with the third one. Assert at CP2 is the same in all three cases and F1 is the same in all three cases and that 130 is the same in all three cases.

CAPCOM Roger, John. We copy all that. John, we copy all that.

SC The last pass I only got 4 marks TPC garbled.

CAPCOM 10, Houston. You're breaking up. We'll talk to you when you get on the high gain. We've lost you, over.

END OF TAPE

SC Houston, are you reading us high gain?

CAPCOM Hello, Apollo 10, Houston. We have a TEI pad for you and rev updates and landmark tracking updates. Over.

SC Go ahead. You want to start on the map update?

CAPCOM Your choice, 10. Over.

SC Go ahead.

CAPCOM Roger, Tom. First we'd like - we got a state vector for you'll give us POO and ACCEPT, and I'll start out with the map update for rev 27. 12 -

SC Okay, we're in POO and ACCEPT.

CAPCOM Okay, 10. Coming at you with rev 27 map update, 1271515 1272626 1280126. Okay a landmark tracking update coming at you for CP1, 1273502 1273803 000053000 north 141241. Are you with me? Over.

SC Go ahead. Over.

CAPCOM Roger. CP2 is T1 1275025 1275130 000011000 north 050350, F1 T1 time for F1 1280310 1280455 000331000 north 101441. Okay for 130 T1 time for 130 is 1282416 1282547 000268000 north 121240. And we got a TEI 27 pad if you're ready to copy. Over.

SC Okay, stand by on the TEI pad. Okay, go ahead, Charlie.

CAPCOM Roger, Tom. TEI number 27 SPS G&N, we're N/A down to noun - through noun 48, noun 33 is 129391871 plus 32367 plus 00410 plus 3 balls 75 pitch angle 061 and it's 2 jets for 14 seconds on the ullage, and I'm standing by for your readback.

SC Okay, we'll start on the landmarks. First, we'll start the maps starting with 27, 1271515 1272626 1280126 CP1 1273502 1273803 000053000 north 141241 CP2 1275025 1275130000 011000 north 050350 F1 1280310 1280455 000331000 north 101441, 130 1282416 1282547 000268000 north 121240. Over.

CAPCOM Rog. All a good readback. Standing by for the TEI pad.

SC Roger.

SC TEI 27 is SPS G&N noun 33 is 129391871 plus 32367 plus 00410 plus 00075 and pitch is 061 and 2 jets 14 seconds.

CAPCOM Rog, good readback, Gene, and the computer's yours. You can go back to the block. And Tom, we got a TV plan for you if you'd like to turn to page 385 in your flight plan, and we'll run through that and see what you think about it. When you get there, give me a call. Over.

SC Okay, I'm there, Charlie. Go.

CAPCOM Okay, what we'd like to do is - we

CAPCOM think we can - on rev 29 we can get good high gain and TV on both revs 29 and 31 by doing the following things: on rev 29, we'd like to get the obliques to landing site 3 at (garble) to the flight plan, that is roll angle 180 ordeal of 339 in pitch heads down, and we'll send you the landing site 3 pad as scheduled. This will give us good TV obliques for training and a high gain acquisition, but the high gain acquisition may be delayed just slightly, but we think we'll probably get it right away. Now on rev 31, coming up on page 389, we'd like to - during the descent strip photos we suggest that you fly them as you flew them this morning when you were doing the vertical stereo on rev 23 with a roll angle of 180 an ordeal of 282 in pitch, and our remarks are to remember to pitch as required to shade the windows near the terminator, and again we'll send you the pad as scheduled. Now this attitude will give us good TV - good high gain for TV panoramas of what you guys are seeing flying backwards, and if you concur with that schedule, we'd like to go as is. Over.

SC Okay, that seems real good now, and we'll get an update after that on - unless you want to update pad 4 TEI after that, and we should be all squared away.

END OF TAPE

SC We'll get an update after that we'll update pad 4 TEI after that and we will be all squared away.

CC Roger. Very good. If you feel like we're pushing you on TEI on the REV 31 we can disconcontinue that TV at any time. Over.

SC Okay. We'll check and see how it goes. We want to get everything squared away before TEI and that certainly has last priority but we'll see how it works out.

CC Fine, Tom.

SC I guess we're all squared away to pick it up on the, over. I guess we're all squared away to pick it up after TEI when we come around to look back. Right. Over.

CC That's affirmative. We've got you for the ascend. We'll be standing by. Out.

SC Roger.

CC Apollo 10, Houston. On the Rev 26 tracking that we saw for F1 and 130, John you did a great job. It's looking really great. Over.

SC Thank you. But it was a team effort.

CC Roger.

CC Hello Apollo 10, Houston. You know we'd like you to start the charging B battery. Over.

SC Roger Battery B.

SC Okay Babe. If you think we can hack it. Here goes.

SC Oh it looks good here, Charlie.

CC Roger 10. You're really not pulling much more current at all out of this thing and we think you'll be in good shape. Over.

SC Hey, you know that idea on the fans to build up the CYRO pressure, man that's a great idea. It brings them up, it appears to bring them up faster and uses less energy. Man, maybe we should be doing that all the time.

CC Roger.

PAO This is Apollo Control. We're showing an orbit on this revolution of 67.4 by 54.2 nautical miles.

CC 10 Houston. We've got 10 minutes LOS C over the hill at 12801.

SC Okay Charlie. We've been talking this over and what we'll do is shoot those obliques in the landing site 3. We'll give you the TV pass then. We'd like to continue on and if this Vitacon has the strength like to show you what earth shine is around the moon. It'll just continue on to a delay P52 a little bit and that will be the only TV pass here. Now we think we want to get everything squared away before TEI and then after TEI as we leave the moon I'll turn around, we'll turn that barrel full time for you. Over.

CC. Roger 10. That's a good plan. We concur. Over.

SC Roger.

END OF TAPE

PAO This is Apollo Control at 127 hours, 15 minutes, and we've had loss of signal on the 26th revolution. Just prior to acquisition on this revolution the crew saw the descent stage of Snoopy, the lunar module. After we acquired, Tom Stafford said well they had been behind the moon and saw what looked like a star out of place, but that Gene Cernan, using the monocular could see the legs of the descent stage and was identified as part of Snoopy. Tom reported it appeared that Charlie Brown was catching up slowly to the descent stage but was in a different plane. Landmark tracking continued throughout this pass. We passed up a TV plan suggesting televisions transmissions on revolution No. 29 at 132 hours. This will be while the crew is taking oblique photographs of landing site 3 and we suggested, if possible, descent or TV on rev 31 while the crew is taking descent strip photographs. That should be at approximately 134 hours elapsed time. Little bit later Tom Stafford came back and scrubbed out the revolution 31 television, pointed out that they would be busy getting ready for the transearth injection burn. He indicated that on the revolution 29 television that in addition to providing television during the photography, he would leave it on a little bit longer and attempt to show earth shine. He also indicated that he would turn the television camera on after the transearth injection burn and leave it on for awhile. We presently showing at ignition time for transearth injection of 137 hours, 36 minutes, 28 seconds. That may change a little bit prior to TEI but it should not change a great deal. As we lost signal on this revolution, Apollo 10 was in a 67.6 by 54.1 nautical miles orbit. The orbital period 1 hour, 58 minutes, 49 seconds, velocity 5,312 feet per second and spacecraft weight 36,750 pounds. We will acquire Apollo 10 on the 27th revolution at 128 hours, 1 minute. This is Mission Control, Houston.

END OF TAPE

SC Okay, Houston, we've finished with landmark 130.

CC Roger, 10, we copy.

CC 10, Houston, we've got quite a few things to talk to you about on the flight plan. We'd like you to, for your rest attitude to change your ROLL angle from 180 to 090. Rest of it is okay. Your high gain changes to PITCH of 00 and a YAW of 240. Over.

SC Okay, Charlie, why don't you run that by us again. No one was on the head set.

CC Okay. Roger. We've got the data. You can proceed on out at 22 and we got the flight plan update for you starting on page 382. Over.

SC Roger. Wait a second.

SC Go ahead, Charlie.

CC Okay. On the rest attitude at 12829, we'd like you to maneuver to a ROLL of 090 so we can cool down quad A and the PITCH and YAW are the same as listed in the flight plan. High gain antenna angles are PITCH of 00 YAW 240. Okay, go on down the page to fuel cell 02 purge - we'd like you to do the fuel cell on 02 purge on fuel cell's 2 and 3. And same page we have a map update rev 29, if you are ready to copy. Over.

SC Go ahead and I am going to go ahead and start the fuel line on the purge right now on 2 and 3.

CC Roger. Okay, rev 29, map update. 131122413123 18 1315835 .

END OF TAPE

SC -35

CC Do you want to read that back to me. Over.

SC Okay Charlie. Rev .9 is 1311224 13123181315835.

CC Okay Roger. And let's go on to page 385 in the flight plan.

SC Okay but we changed cannister B a little bit late. Let me find it for you. I'll tell you exactly when we changed it.

CC Stand by.

SC We changed it at 120. We changed cannister b late. We changed it at 127 hours.

CC Okay. We copy cannister B at 127 hours and we have an update on page 385 if you're ready to copy. Over.

SC Go ahead, Charlie.

CC Okay Gene. 385 the updates for the oblique strip- we're giving you the same updates as this mornings. Roll, pitch and yaw are, roll 180339000 your T zero F8 time is 1321748 change to F2.8 at 1322716. Okay your T1 time is 1323016. P2 is 1323216. Now the F8 and the F2.8 F stop are stop changes for the sequence camera only. We'd like you to use F4 at 1/125th for the black and white. Over.

SC Okay. I got oblique strip roll, line zero pitch 3390 yaw 0000 T zero is at 1321748-that's at a F8 and go to F2.8 at 1322716 and that's all under sequence. T 1 is at 1323016 T2 is at 1322116 and use F4 127 on the black and white all the way.

CC Okay. Gino. Good readback. Those roll, pitch and yaw angles are ordeal angles. Okay, I've got a TEI 29 if you're ready to copy. Over.

SC Go ahead.

CC Okay before we start on the pad we'd like you POO and accept. We have a state vector for you. And comeing in with a TEI 29 SPS G&N start with NOUN 33 133373669 + 34079 +00166 +01719 pitch 056 2 jets for 14 seconds on the ullage.

SC Charlie. Give me noun 81 delta V X again Please.

CC Which delta V you want Gene?

SC Delta VX.

CC Okay. Delta VX is + 34079. Over.

SC Okay. TEI 29 SPS and G&N NOUN 33 is 13373669. NOUN 81 is + 34079 + 00166 + 01719 and pitch is 056 is 2 jets for 14 seconds.

CC Rog. That's a good read back. Now I've got some stuff for you on the fuel cells and the CRYOS we'd like for your sleep period. It's quite lengthy. You might have a pencil ready so you can copy down some of it and I'll try to read it slowly and repeat all that you need. We'd like you to stir the CRYOS and before going to sleep turn all fans off. We'd like high power switch OFF SCS electronics to ECA. 02 tank 2 heater AUTO, 02 tank one heater to OFF. Are you with me. Over.

SC I'm with you Charlie.

CC Okay Gene. Continue on. We'd like H2 tank 1 heater AUTO, H2 tank heater to OFF. You can leave battery B on CHARGE and we'd like the power up to high-gain antenna for the sleep. On the fuel cell configuration you can leave as is and we'll place fuel cell 1 on both Main A and Main B one and a half hours prior to the TEI burn. Over.

SC Okay Charlie I understand. I'll cycle the CRYO fans and all optic power off. SCS electronic ECA 02 tank heater No. 2 to AUTO, No. 1 to OFF, H2 tank No. 1 to AUTO and 2 to OFF. Continue batt b charge and power up the high gain.

CC Roger Gene. Good read back. Now that our present temperature decrease on fuel cell 1 we will not have to put it on the line prior to the above time. The minimum temperature for fuel cell 1 is now 370 degrees 370 skin temp. So we'll place it on the main busses to raise the temp in lieu of using the inline heaters during trans-earth coast I'd like to emphasize, please do not use the fuel cell heater on fuel cell 1. And at the present rate of decay of temperature in fuel cell 1 it looks like we'll have to put it on the busses about every 20 hours. Over.

SC Fine. That suits us fine. Charlie.

CC Okay. Good. One little last thing is we got some word for you on the storage of the LM cameras and the LOH cannister. We suggest that you wrap the cameras in an LCG and store them in AA. Stand by 1.

CC 10. Stand by we got a recent update on the camera stowage, we'll be right with you. Over.

SC Roger. Houston. Say again now we're going to go to the maneuver sleep attitude at this time.

CC Roger. That's fine Tom. Go ahead. Go ahead for the maneuver and your computer chores and I'll be back with you when I get to high gain on the Hasselblat and cannister. Over.

SC Okay.

END OF TAPE

SC Houston, Apollo 10, over.
CAPCOM Go ahead, 10.
SC Roger, let me summarize this landmark tracking thing. The last half. I think we only got 4 marks on one of those CP's. Let me summarize the whole thing by saying I think you ought to throw out CP1's first pass and F1's first pass cause I don't think they were on them. They were on the same site. I don't think CP1 was the same site that actual CP1 was on the other 3 passes. Same way for F1's first pass. But I feel pretty good about all the rest of the sightings. I think they're all on the same spot of ground and I'll point it out to you when we get back. And I guarantee you that all the stuff on 130 was on 130.
CAPCOM Roger, John. We copy. It was really a great show on the landmark tracking. Everybody's worked real - very pleased with everything and we understand you suggest going out the first pass of CP1 and F1 due to incorrect - possible incorrect landmarks. On the last pass of CP1 we copy - we've only 4 marks on that one but they look real good and everybody is in past happy as a clam with everything and we're all set for you guys to go to sleep.
SC Okay, and if we don't learn nothing else, we ought to know where 130 is.
CAPCOM Hey, John. On 130 you're within 3 hundred feet on your altitudes on every pass across 130. It's really great. The Ampad's calling you the mechanical man.
SC Now, if I can just try to get home. Yeah. You should have seen him he was really putting it right on the money there. It was great.
CAPCOM Rog, we could tell it from the data, Tom. It looks really great. 10, that's all we got for you. We're going to hold up on -
SC Yeah, I was going to say, Charlie, if George Miller is around there tell him to smile. Over.
CAPCOM Okay, he was grinning last night. I haven't seen him tonight. That's all we got for you, 10. We're going to hold up on this stowage of the cameras and the canister till we come back in the transearth coast, over.
SC Yeah, rog. We're only going to be pulling about 1 G when the engine fires off here, Charlie. We got everything already pretty much configured for that so we'll be in good shape to take care of the rest of it, over.
CAPCOM Rog, we concur. Out. Hello, 10. We have you on the high gain antenna. Do you read me? Over.

SC Roger, Charlie. Read you loud and clear.

CAPCOM Roger, Tom. One further recommendation. Quads Bravo and Charlie are the fattest and we recommend for the sleep period you configure the DAP. For attitude control using Quads Bravo and Charlie and otherwise you're in good shape. Good night and we'll see you in 3 and 1/2 hours or so. Over.

SC Okay, roger.

PAO This is Apollo Control at 128 hours, 50 minutes. The Apollo 10 crew begins a 3 and 1/2 hour rest period after a considerable amount of landmark tracking and photography today. We still have 23 minutes acquisition in this pass. We will stay up through the loss of signal, however, we probably will not hear from the crew or contact them again during this pass. First half of the pass during this acquisition on the 27th revolution was very quiet as the crew completed landmark tracking on landmark 130. We then passed up some flight plan updates. Gave them procedure for the fuel cells during the rest period and informed them that we'd like to have fuel cell 1, the fuel cell that has been -

SC Again on these Quads. You want us - we don't want to use Quad A. You want us to use Quads B and D, over.

CAPCOM That's negative. Quads Bravo and Charlie, over.

SC Roger, you want us to fail A and Dog, over.

CAPCOM Affirmative.

PAO Fuel cell 1 has been off the lines since a pump associated with the fuel cell failed some time ago. The fuel cell itself is all right. There's nothing wrong with the fuel cell and that fuel cell 1 will be placed back on the line an hour and a half prior to the transearth injection burn. John Young again reported on the tracking tasks and received praise from the ground for the job he has been doing in this landmark tracking. We'll continue to stay up through - live through LOS about 20 minutes from now.

CAPCOM Hello Apollo 10, Houston. Sorry to disturb you again but we notice your DAP quad fails incorrectly. We'd like you to load 00110 so that we'll have some pitch attitude control, over.

SC Okay, you want 0 - say that again, Charlie.

CAPCOM Roger, Tom. In register 2 we'd like 00110, over.

SC Okay, got it.
CAPCOM Hello Apollo 10, Houston. We're not going to give up. We got - we notice your quad Charlie auto RCS light switch light is off. We'd like for you to configure Bravo and Charlie auto RCS light switch is on. Alpha and Dog off, over.
SC Roger, Alpha and Dog off, Bravo and Charlie, on.
CAPCOM Affirmative.
SC Hey, you may just say goodnight Charlie but you want Alpha and Charlie off, Bravo and Dog on. How you going to get any pitch control.
CAPCOM We want Bravo and Charlie on and Alpha and Delta off, over.
SC All righty. Bravo and Charlie on, Alpha and Dog off. Got it. Thank you.
CAPCOM Rog.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5-23-69, GET 129:00, CDT 20:48 445/1

PAO This is Apollo Control at 129 hours, 13 minutes. We've had loss of signal on revolution 27. Acquisition time for revolution 28 is 130 hours. We do not expect to have the conversation with the crew during that acquisition. We're now in a 3 1/2 hour rest period. We will come up and bring you any conversation we do have on the next revolution. We're now showing Apollo 10 in a 67.9 by 53.8 nautical mile orbit with an orbital period of 1 hour, 58 minutes, 50 seconds. This is Mission Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5-23-69, GET 130:05, CDT 21:54 446/1

PAO This is Apollo Control at 130 hours, 5 minutes. We have acquired Apollo 10 on the 28 revolution. There has been no conversation, and we do not expect any. The crew still has an hour and 52 minutes in its rest period. The TEI time transearth injection time has not changed yet, still remaining 137:36:28. This may be refined later, but the present time, that is the latest ignition time. The black team which has been let by Jerry Griffin today will change shifts slightly early this evening, and we have scheduled the change of shift news conference for 10:30 pm central daylight time. If there is conversation during this acquisition time, we'll bring that to you. This is Mission Control, Houston.

END OF TAPE

APOLLO 10 COMMENTARY, 5/23/69, CDT 2206, GET 130:16 447/1

PAO This is Apollo Control at 130 hours, 15 minutes. Flight surgeon reports that Tom Stafford's heart rate is in the mid forties, that coupled with his respiration rate indicates that he sleeping. Stafford is the only crew member being monitored at this time. John Young and Gene Cernan are in the sleep stations beneath the couches and do not have biomed monitoring at this time. This is Mission Control, Houston.

END OF TAPE

APOLLO 10 COMMENTARY, 5/23/69, CDT 2306, GET 131:17 448/1

PAO This is Apollo Control at 131 hours 17 minutes. We've had loss of signal now as Apollo 10 has gone behind the moon on the 28th revolution. We'll be reacquiring the spacecraft again in about 41 minutes at - as it is moving into the 29th revolution after it has begun the 29th rev. And on that revolution, we'll have our first look at lunar landing site 3, hopefully. We have a televsion transmission scheduled which will include the landing site in the central bay of the moon. The crew will also be taking oblique strip photography of that landing site. During the change of shift briefing, we had no farther conversation with the spacecraft. The crew is still sleeping. They have now been in that sleep period - sleep period for a little over 2 hours. At 131 hours 18 minutes, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 131 hours 57 minutes. We're now less than a minute from reacquiring Apollo 10 on its 29th revolution of the moon. The crew has been in a rest period for about 3 hours and if they are not awake on their own accord as we reacquire the spacecraft we'll put in a call to the crew and awaken them. We have scheduled on this revolution photography and hopefully television of lunar landing site 3. We'll be standing by to hear from the crew in about 30 seconds now.

PAO Capcom Joe Angle is getting ready to put in a call to the crew.

SC Hello Houston, Apollo 10.

CAPCOM Hey, good morning Apollo 10, how are you doing this morning?

SC Oh, just woke up from that little nap. Pretty good, we had kind of a long day.

CAPCOM Roger that Tom. What have you got there for crew status when you get a chance we're standing by for that.

SC It was just a nap Joe. As I look around here, this is Gene Cernan calling from the moon, as I look around there's three of us, John Young, Tom Stafford, and myself and status has been fairly confident. Can we help you?

CAPCOM Okay, you got me. Okay 10 this is Houston, we're standing by for some TV on this pass and I've got some pads to update to you. I've got a maneuver pad and a couple of map updates, and as soon as you get a chance we would like to have crew status as per the flight plan there.

SC Okay, nobody has taken any of the little pills and we'll read you out some revs in a minute, over.

SC Hey, that'll be fine, thank you Tom.

SC Go ahead with the maneuver pad. Let's get that one out

CAPCOM Okay, you're ready to copy?

SC Yea Joe, here I am, go ahead.

CAPCOM Okydoke, this is for TEI 30 SPS G&N. On your noun 33 it's 1 3 5 3 7 1 8 4 5 +35111 +00049 +01010, pitch 054 all else is NA and I stand by for the read back.

SC Okay, TEI 30 SPS G&N 135371845 +35111 +00049 +01010 pitch is 054 and if you didn't get noun it's 135371845.

CAPCOM Okay, Geno, we copied that and if you'll give us the computer we'll send the state vector up to you.

PAO Apollo 10 is still about 20 minutes away from the approach to lunar landing site 3 at which time we would hope to get TV transmission.

SC Hey, Joe, are you ready to pick up high gain at this time on TV, we're on the air.

CAPCOM That's affirmative, we're all ready for it Geno.

SC Okay are you finished with the computer. I need to get the verb 83.

CAPCOM Roger, we're all done, you can have it back now.

END OF TAPE

PAO You have heard Gene Cernan advise that the crew is transmitting television, and we should be receiving that shortly. At the present time, we're still standing by to get a lock on the high gain antenna.

SC Apollo 10. Over.

CAPCOM Roger. Go ahead, 10; Houston.

SC Roger. That's Neper crater right there. You see it?

CAPCOM No, we're not getting a - Yeah, there we go. Okay, you bet ya.

PAO We've got a black and white picture. Still waiting for the color.

CAPCOM Roger, it's coming in real good now, John. It's right in - just about in the center of our screen. Roger, it's coming in real good now, John. It's right in - just about in the center of our screen.

SC ... well this is another crater, here, I just panned down to.

SC What does the color look like, Joe. Again, the lunar surface is tan except ... is more of a dark brown and again, the lunar areas look more like ..., like whitish, chalky white. Over.

CAPCOM Yeah, it's just the way it looks down here, Tom. And at the top of your - at the top of your picture, just a moment ago, we had a darker, looks like a mare area up there.

SC That's the crater in - -

SC Roger. That is a mare area with a central peak.

CAPCOM Roger, that central peak sure stands out, John.

SC Yeah, and it's wide on the bottom and sort of - sort of black-gray on the top. And then there's some white right up at the top of it.

PAO Apollo 10 is about 54 miles high.

CAPCOM And we've got that tannish color, that kind of a grayish-tan color and then the mare area comes out dark black and the white area is just what you say, Tom they look like gypsums.

SC There's a really bright ... crater. Little bitty one.

SC I don't know if you can see it or not, but it's - that white crater in the center of your screen,

CAPCOM Roger, we got it.

SC It has a black spot right in the middle of it. It has a black spot right in the middle of it. That's a very small impact crater, very - I don't know whether it's an impact crater or not, but it's very new. It looks new.

CAPCOM Okay, you're talking about the fairly small one, are you not, John?
SC Yeah, it's very tiny. Just a white spot.
CAPCOM Yeah, I think we got the one you're referring to, however we can't see the spot in the center of it. We don't have quite that good a definition.
SC Roger. Here's another bright one inside of a rather larger crater with a little darker - little darker brownish type bottom on it.
CAPCOM Yeah, we get the spot
SC - over on the side it has two, you don't have the two dark spots in the center of it.
CAPCOM What is that white spot? Is that a small crater on the side of it there?
SC Roger, that's a small impact crater. If you're seeing the same thing I'm seeing on the monitor, why are you not - I don't imagine they'd be terribly easy to tell what all is going on out there. But it's a pretty good picture, all things considering from how far it's going.
CAPCOM We've got a real good picture down here, John. And - Yeah, that little white crater on the left-hand wall there, stood out real well, and the craters that you're showing us now, looks as though you've got a central peak in one of those. Let's see if we can figure out which ones they are, there.
SC Roger. Look at that hill over there on the right.
CAPCOM Roger.
SC I'll sort of pan - I'll pan the horizon, here, if you can see that this is not a very flat moon. Look at all these - that's actual hills you're seeing out there and they really stick up. And we just saw Snoopy rise and maybe you can see it in your picture.
CAPCOM We can't see him. Where about in the picture is he now, John?
SC He's just right behind us, but he's not very far back there.
CAPCOM Okay. Hey, which way are you - are you looking, John?
SC We're going backwards right now. Okay, you're sweeping the other side of the horizon. No matter where you look on the moon, there's always some different geological structure to study. Boy, it's really got its share of them. Now, we're coming to a place with the mare is getting darker. And, I don't know if you can tell it from this picture here, but there are a couple of spots in the middle there, that stand out a little better. Evidentally, much blacker than the - than the actual mare.
CAPCOM Yeah, we got them. Those looked pretty darn interesting.

SC Hey, Apollo - Houston, this is Apollo 10. Look, I know you ran some studies, but by golly, we can see Snoopy, and he isn't too far away. He's catching up with us. Does he talk to the fidos? He's right down below us. We can occasionally see him tumbling end over end down below there, and he's coming in closer for each pass. That's Snoopy's descent stage. We can see him right down below us now, and he's right - I thought he was a little out of plane, but now he's looking more in plane with us.

CAPCOM Okay, that's real interesting, Tom. We'll try and get fido on that.

CAPCOM Apollo 10, this is Houston. John, are you looking out directly east now, or were you looking directly east there?

SC We're looking backwards.

CAPCOM Yeah, okay.

SC Snoopy is behind us. But we are going BEF.

CAPCOM Roger, copy.

SC Yeah, we're looking back east and Snoopy's back there and evidently, he - earlier we saw him and he was out in front of us and going above us and now he's behind us, but he's right around in our area, I'll clue you.

CAPCOM Okay, can you estimate at all about how far below you think he is, Tom?

SC We've lost him down in the mare now.

CAPCOM What kind of a - of a pitch angle are - were you looking at him, do you think when you - whe you last saw him, Tom? Some local or horizontal.

SC We're looking, oh, about - we're looking straight out at about 215.

SC It's taking forever for verb 83 to come up, here.

SC Originally, we thought he might

END OF TAPE

SC Originally, we thought he might be out of plane, but that sure didn't look much out of plane to be where we finally found him. He's getting awfully close. You could see the silver panels and - there he is right down below us; he's trying to cross the Taruntius ... Yeah between Taruntius P and K. That rascal is right in plane with us. I'm looking down now at 257, he's right down below us.

CAPCOM Okay, John -

SC He's down low and he's going to be coming up.

CAPCOM Rog. Okay. Do you have any idea of range or is that a ... Tom?

SC No, but I can see occasionally the sun ... down below. He couldn't be over 10 miles. It's hard to say.

CAPCOM Yeah, roger.

SC See, what I saw John, yesterday - we sure don't like to around here playing pushups with that rascal.

CAPCOM Roger that.

SC You got ... tonight on Snoopy. He's out to get you.

SC There he comes again.

CAPCOM Okay, are those the Taruntius craters you're showing us?

CAPCOM 10, this is Houston. That rille you're showing us now, really is coming in clear.

CAPCOM 10, this is Houston. That sure is mighty interesting territory you're showing to us. Those rills and looks like slope features there; they're pretty darn interesting.

CAPCOM Apollo 10, Houston.

SC Go ahead.

CAPCOM Rog. Tom. If you can kinda keep one eyeball peeled out for Snoopy, there, and give us another act when you pick him up again, with relation to either pitch angle or some ground features we might be able to give you a rough estimate on what his orbit is.

SC Well, that isn't the idea - okay, but the ... in question, he was out in front of us and now he's moved down, it looks like our orbits are crossing. and I know -

SC Hey, there's Cyrillus up there folks.

SC And, Boy, you can't - you can't see it from here, but is that rascal bright.

CAPCOM It sure looks bright from down here, John. It's standing out like a diamond.

CAPCOM And, 10 this is Houston, is that area outside the bright ray, there - bright ray area is that kind of a brownish grey or that's the way it's showing up on our color anyway.

SC There's a ...

SC Okay, Houston, rattle snake and down and back rills right here.

CAPCOM Roger.

PAO The Serpentine rill is about a mile wide.

SC We're coming right - coming right into site 2. The small craters down there that break a light range of site 2 and you can see some of the ridges down here very plainly and when we get there John can probably show you Mulkey which will be on the right-hand side of your screen.

CAPCOM Okay.

SC And just to the right of Mulkey is what we're calling U.S. 1 which is a tremendously wide Gulf.

CAPCOM Okay, Gene, this is Houston. We get you on the master looks like you're timing right over the ... right now and just about to come into Mulkey, is that affirmed.

SC That's affirmed.

SC Okay, here's U.S. 1 and we're just right over the landing site, ourselves, looking back.

CAPCOM Rog. U.S. 1 standing out real good.

CAPCOM And we pick up a chuck hole right in the middle of U.S. 1, there.

SC You can probably see where U.S. 1 up here, it sorta looks like a straight slip fall, it's just about the full width of the Gulf, itself.

CAPCOM Roger.

SC We're coming up on Sabine and Ritter at this time.

CAPCOM Okay.

SC You're looking at Sabine and Ritter and very soon will be crossing Schmidt. We're just going over landing site 2.

CAPCOM Okay, we're getting real good resolution again on this TV, tonight. We're picking up all these things real good. And that's Schmidt crater is that affirmed?

SC If I'm not mistaken. That's affirmed. You're looking right down into Schmidt.

END OF TAPE

SC Okay, do you see any of the boulders around the edges that we can see from here?

CAPCOM Can't honestly say that we can see anything besides the boulders there, Tom. It's sure a good picture, though.

SC Okay, Joe.

CAPCOM 10, Houston. We couldn't see any boulders but we could sure make out the slumps on the inside of that crater, there.

SC Some of these astros look pretty deep to us.

CAPCOM Roger that.

CAPCOM 10, that shadow pattern on the bottom of that crater is real interesting. It - it looks like theon, Does that copy with what you've shown us.

SC Say again, Joe.

CAPCOM Roger. That crater you were just showing us, the shadow pattern on the bottom was a real interesting pattern. That looked like theon crater.

SC I'll confirm you're right. We're almost past landing site 2 now. ... stretches up on into ...

CAPCOM Roger.

SC Okay, here's an interesting - more than a ridge, it's a ... ridge, jagged features, it looks like it's smooth up to one end and then just on the other side, it looks like it might also be very high in contrast much lower than some of the other surrounding craters, though.

CAPCOM Roger, I think we see what you're - what you're talking about.

SC It almost looks - Okay, it almost looks like it's a flow. And it comes down the valley and stopped right - right at that point and it's been dusted over, but it appears to be the front end of some type of flowing. The first time we really had a chance to look at that.

CAPCOM Yeah, that looks real good from down here, Gene. We can pick that up. That's a good call.

CAPCOM Boy, that one really looks rough. I think we got that as ... crater. Is that affirm?

SC That's affirm and the walls are very light, whitish-gray and the bottom is a dirty, dirty, tan. It's got a central peak that - it's got very big boulders in the bottom. We can see some here, and it's got on the - on the far side, on the upper side of your screen, the side is slumped down in stages, it appears like, and it's not slumped down smoothly like you see on the bottom side. It's mostly in shadow, but you might be able to make it out.

CAPCOM That's - that's just great and that's a good call, that's a great description, too. We couldn't make the boulders out but that slumping is coming through, just as you described it.

SC We're getting into the area of long shadows as we approach the terminator at this point.
CAPCOM Roger.
SC Okay, pitching down around a half a degree per second.
CAPCOM Apollo 10, this is Houston. I know you'll are keeping an eye out for Snoopy. You haven't happen to see him again, have you?
SC Negative. It's going to be awful hard to. We're going into sunset here.
CAPCOM Roger.
SC You know, about 4 minutes ago, I thought I saw him go - I thought about four minutes ago, I thought I saw a glimpse of him go vertically below us. However, it was just a quick glimpse and there was something glistening,.. it was hard to tell whether it was a close-by particle, or something white hot, Joe, I - and I only saw it once.
CAPCOM Rog.
SC We're moving to the left-hand window now because of the sun off the hatch window.
CAPCOM Okay. Gene, about 15 or 20 seconds ago, you were showing us a bunch of little, what looked like domes, there. Did they look like little domed hills to you?
SC There's some little domes out there. There's plenty of little domes out there, now which ones you're talking about, I sure don't know.
CAPCOM Okay.
SC Tom's going to give you a look at a lot of rilles and the area he's looking at outside the left-hand window.
CAPCOM Okay, our signal is breaking up a little bit right now, but keep shooting; we'll try and get it squared away.
SC Okay.
SC Joe, because the sun's shafting on the forward window, Tom's got you out the left-hand window, looking to the north.
CAPCOM Okay, we're still not getting a good picture. You'll - -
SC And it would be an area - Seeing down in front of us, our number of rilles that look very much like we saw back on landing site number 2 area. We're just beginning to see some of these areas because we're coming into sunlight now. The area right here, appears to be very familiar in terms of number of ridges and the highway 1 type of rille, and I see again another area where a very wide rille, probably three quarters of the widest highway 1, where there's another, what could be or what appeared to be a break-slip... kinds of movement between one side and the other.

CAPCOM Okay. We - We've lost our picture, we think because our high gain antenna, Gino. If it's possible, if you could see that - rotate it back around to your visual attitude.

PAO We've still not been able to lock onto the spacecraft high gain antenna. At this time, Apollo 10 should be just about overlanding site 3 at an altitude of about 62 nautical miles.

CAPCOM Apollo 10, Houston.

CAPCOM Roger, 10. We're just barly reading you. We're not getting any TV picture now. Have you secured the camera?

END OF TAPE

CAPCOM Apollo 10, Houston.
SC Go ahead, Joe.
SC Go ahead, Joe.
CAPCOM Roger, Gene, we'll just (garble) we're not getting any TV pictures now. Have you secured the camera?
SC (There is static and cannot hear)
SC And one thing, we'll try to keep it on just a few minutes to see if we can pick up earthshine, here.
CAPCOM Okay, very good.
SC What did Fido say about Snoopy? Over.
CAPCOM I'm sorry, Tom, I cut you out. Say again.
SC What do your fidos say about Snoopy? It appears in our analysis that basically we've seen him going small end forward. And now we were turned around and you know ... up and he's always been out in front of us going from us, but this time he was right down below us. So it looks like we are catching Snoopy. Is that their analysis? Over.
CAPCOM Well, Tom, I think maybe we misunderstood your first call. When you said call him out on this pass did you say he was down behind you and you were at about a 215 pitch angle?
SC Well, he was - he was - we were looking right at him at 215 pitch. So evidently he's out in front of us.
SC Well, maybe he is behind us you see I didn't have the orb rate going; the computer wouldn't cough me out a solution and so I was looking inertial, when I finally got him and as we were pitching around at 330, I think he was out in front of us. But he wasn't out in front of us near as much as he has been and he was down below us definitely, and always before we've seen him out in front but way up above, but there's no doubt, he's getting lots closer. Over.
CAPCOM Roger. Okay. And when he passed right directly below you, that was when you were right over Taruntius, is that correct?
SC Yeah, we had Taruntius when we were there and he was down below us.
CAPCOM Okay, we got that call okay, and we're trying to figure out where - what Snoop's doing right now.
SC Yeah, I know it's highly improbable a collision, but it'd sure ruin your whole day, if it ever happened.

CAPCOM Roger that.

SC Okay, I've got Snoop down there and and reflected - I'm aiming right at him. He's down below us and I'm pitched at 336 and Snoop is in about the plus X going across the crater. See him down there?

SC He looks right plain; he's in reflected sunlight; he's in reflected sunlight; the rascal isn't too far out there; I'm now pitched at 340 degrees and my X axis is right at him so Snoop is out in front of us and below us. Over.

CAPCOM Roger. We copy, Tom. And he's probably coming up. Is that affirmative?

SC That's affirmed. I would say he'd be coming up and heading up towards his apogee.

CAPCOM Roger that.

SC Or should I say apolune?

CAPCOM Rog.

SC He's moved out in front of us.

SC He's just playing into his own sunset right now. We've just lost him.

SC We may be able to pick him up in earthshine.

CAPCOM Okay, we'll crank those angles in and that alongside of your sighting of him right directly under you over Taruntius, that should - we should be able to come up with some sort of a guestimate on how close he's going to be right there ... think that when you saw him directly under you, that's probably the closest point that he'll be to you in his orbit.

CAPCOM We're going to keep working that though, Tom.

SC Okay. Of course, you know, reflected- Sorry, Joe - . On reflected sunlight it's awful hard. However, earlier we could see the sparkles off his legs, though, and some different colors there as the sun would rotate off the panels, but that was with the 28 power binocular. Over.

CAPCOM Rog. Understand. That's still plenty close.

SC Yeah. I'd say so.

SC Okay, we have earthshine real good here and Gene will try to give it to you out the window. We got the ...

CAPCOM Okay. Old Snoop's just a devoted old hound dog, Tom. He'll probably be trying to follow you back home.

SC Just as long as that rascal doesn't sniff too close.

SC You know, earthshine is very bright

SC light, but it doesn't feel like it's going to be very bright to the camera. I don't think we're going to get anything. I thought maybe we'd get the earthshine horizon here, but I don't think we're going to.

CAPCOM Okay, I'm afraid we're not getting any picture at all down here, Gene.

SC Okay, Joe, we'll go ahead and ... it in. I thought the light level was pretty low where the eye could adapt to it. It's pretty dark down there, I must admit.

CAPCOM Okay, mighty fine. I've got a couple of landmark tracking updates and a map update for you when you're ready to copy.

SC Stand by. We're getting ready to the camera secured and some other stuff.

CAPCOM Roger that.

SC Okay, Houston, Apollo 10. Go ahead.

CAPCOM Okay. I'll give you the landmark tracking update pass first. This is for rev 30. Your P-1 is 134 15 56, P-2 is 134 17 30, For roll all balls. Pitch 282 and Yaw all balls. North 29 29 41, and that was for site B-1. For 150 P-1 is 134 27 40 134 29 12 roll is all balls, Pitch 246 Yaw all balls. North 02 02 40 and I'll stand by for a readback on those two.

SC Okay. Give me the first one on B-1. I missed that, the first P-1.

CAPCOM Roger. P-1 is 134 15 56.

SC Okay. With the readback P-1 for B-1, 134 15 56, 134 17 30, 000, 282, 000, North 29 29 41, 150, 134 27 40, 134 29 12, 000, 246, 000, North 02 02 40.

CAPCOM Roger. That's a good copy on a readback and let me know when you're ready for your map update.

SC Go ahead, Joe.

CAPCOM Okay, this is for rev 30. LOS will be 133 10 56, 133 21, 44, 133 57, 05.

SC Roger. Readback: 133 10 56, 133 21 21 24, and 133 57 05.

CAPCOM Okay, on your second row there, Tom, that's 133 21 44.

SC Roger. That's 133 21 44.

CAPCOM Roger. That's correct, Tom.

SC Okay. John's going to an IMU realinement just for academic interests. I'd like to talk a little more about Snoopy. Obviously, he was out in front of us and he'll be going out in front of us and coming up higher. Now, as such, I'm trying to make a relative motion plot in my own mind here, and it looks like at TEI, if he continues to do that and we burn and zip out there, well we

SC could be fairly close. Over.

CAPCOM Okay, Tom. What Fido has come up with, if you initially pick him up behind or if he was behind you and then he passed directly below you, and if coming up in front of you now, what he should do is continue to climb on up above you and therefore fall back behind, and will continue to fall behind and at TEI, you should be between 5 or 600 miles out in front of him. What had happened, evidently, is you ... him once and this probably will be the only time you'll get a chance to see him until you leave the lunar orbit.

SC Okay, That's what my initial estimate was of what I called into Charlie earlier. It looked like that we were, you know, and naturally he went away, out - about us and behind us and it looks like we've already caught up with him, and I didn't know what the rate of catch-up was. But - the whole thing when we saw him down below and laying bat, I see ... we've already lapped him and he's going to continue to go. That's good. Over.

CAPCOM Rog. Understand Tom.

SC I can tell we're right in the place where the orbits should cross and I was trying to plot a relative motion, picture in my mind and fly at the same time, and do as good a mission and it wasn't too easy, but there's no doubt about it, we were so close to the rascal you could see different colors in the sun glint between the black and the silver pedals on the sides of the descent stage. Over.

END OF TAPE

SC Yeah, I admit that the possibility of a rendezvous is real low but give us time to look over it, over.

CC Roger that Tom.

SC Rog.

CC 10, this is Houston. Tom, other than this REV can you recall what other REVs you've seen Snoopy on?

SC We've seen Snoopy on every rev on the landmark tracking. And you know the landmark tracking we did for those 4 revs, and everytime he was out in front of us and would disappear over our head. Over.

SC And when we got to lunar orbit just about local we were pitched down from local horizontal about 20 degrees, you know as John was doing the landmark tracking, maintaining ORB rate, and Snoop would come up over the horizon and disappear over our center hatch window. And each time it looked like we were getting closer, which meant that we were catching him. Over.

CC Roger, understand.

SC Roger Houston. Like I know we were lapping him, but like I said, he was out in front of us now and the whole thing that I was concerned about was the next two relative perigees that Snoop would make the way he'd be coming down and what our pitch would be in that period of time. Over.

CC Okay Tom. We understand that what you tell us. We're trying to piece together what seems to be the most logical route that Snoopy's taking there.

SC Joe, since we were late changing our last canister do you want us to pack off this one or do you want us to change it on time.

CC Okay Gene, we'd like for you to go back on the normal schedule.

SC Okay.

SC Okay Joe, I'm going to roll over 180 degrees here.

CC Okay.

PAO Apollo 10 is now in an altitude of 68.1 nautical miles approaching apogee 68.2, we should say apolune. The crew has just completed realigning their guidance platform. Shortly after we lose touch with the spacecraft -

SC Apollo 10, over.

CC Roger 10, go ahead.

SC Roger. We're showing a 68 and a half by 53.6. Where is the perilune now.

CC Stand by and I'll get it.
SC What point over the surface is it?
CC I check you out there last. Say your last again please.
CC Roger. We're showing a 68 and a half 53.6, where is the perilune now?
CC Stand by okay.
SC What point over the surface is it?
CC I checked you out there last now say your last again please.
SC At what point over lunar surface is perilune.
CC Okay, I'll get that for you, just a minute.
CC Apollo 10, Houston.
SC Go ahead, over.
CC Rog John, we've got your perilune there at 58 minutes north and longitude is 86:58 east.
SC Roger.

END OF TAPE

SC - mount it up so that you can see the lunar surface through the telescope almost well enough so that I believe you might be able to do landmark tracking., on some large features.
CC Very good.
SC I can't see anything through the sextant but the large features come through loud and clear in earth John.
SC Joe, I'm going to lose you, I'm going to put you on OMNI.
CC Okay, thank you, Gene.
SC I don't know why we didn't think to look for that before.
CC John, this is Houston, do you think that you could pick up the same type of features in earth time with about 10 degrees of the terminator.
SC Joe, can you read us at all.
CC Okay Apollo 10, this is Houston. We're reading you now John.
SC You keep calling me by the wrong name.
CC You keep sounding like the wrong guy.
SC I keep getting mixed up myself.
CC Hey Apollo 10, this is Houston. On your comment on being able to pick up these features through the telescope in earth time, so you think you could pick up these features within about 10 degrees of the terminators. This is still in the earth time.
SC The earth time terminator or the night time terminator?
CC The night time terminator.
SC No, I do not because - no. You mean 10 degrees.
CC Roger.
SC Which earth time are you talking about, the regular front terminator qould be impossible because you're not that adapted. You can't see anything when you go into the dark with the telescope.
CC Roger, thank you.
SC You get night adapted and then you can see - then you can see all the terrain features.
CC Yeah okay, we understand, thank you.
SC Okay Houston, Apollo 10, all the way through the landmark tracking we shot photos of opportunity and we just about ran out of film here we shot so much of it. So on this one we're just going to maintain ORB rate with

with our heads up here and set them heads down and we can get pretty good coverage really out the side windows and we shot the whole strips up the other way. So we're - on the rev we're just going to maintain ORB rate with heads up and I don't think there's really any photos of opportunity that we haven't got but we'll still be shooting some.

CC Okay Tom we understand.

CC Apollo 10 Houston.

SC Go ahead, over.

CC Roger Tom, SPIDO is predicting that on the backside at sunrise at 133:26 that Snoopy should be directly overhead, so if you pitch up you might be able to pick him up and right at sunrise.

SC Roger, sunrise, 133:26, thank you.

CC Apollo 10, this is Houston, we show LOS here in about 2 minutes and we should pick you up again at 133:57 which is about 48 minutes from now. We'll keep in contact with you until you go around the corner.

SC Okay Joe, real good, thank you.

CC Okay 10, this is Houston, we'll probably lose you here in about half a minute so we'll see you on the next round and keep an eye for old Snoop.

SC Okay, will do Joe.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, GET 134:09, CDT 2458, 456/1

PAO And we've had loss of signal. Apollo 10 looked good as it went around the corner. We'll next acquire the spacecraft in about 46 minutes early in the 30th revolution. During this revolution, we had some interesting comments from the crew relative to sightings of Snoopy's descent stage, which was left in an orbit of about 10 nautical miles by 190 nautical miles. Of course the LM ascent stage is now in solar orbit. The crew reported that they had seen Snoopy on each landmark track rev, which would have been rev 24, 25, 26, and 27. The spacecraft, rather the LM descent stage appearing out in front and then as Stafford described it disappearing overhead. And each time he said Snoopy would appear to come closer indicating that the CSM was catching and in effect lapping the lunar module. The ground here in Mission Control concurred with that analysis, the flight dynamics officer estimated that at the time of transearth injection, the command module would be about 500 or 600 miles out in front of the LM descent stage. We advised the crew that if they looked directly overhead at 133 hours 26 minutes, which would be sunrise on the back side of the moon, they should be able to see Snoopy directly overhead. As the spacecraft went around the corner of the moon, we were showing an orbit with an apogee of 68.5 nautical miles, and a perigee of 53.3. The orbit continuing to show a decrease in perigee and increase in apogee. The spacecraft orbital weight at this time, is 36 685 pounds, and the orbital period is 1 hours 58 minutes 50 seconds. At 133 hours 14 minutes, this is Mission Control, Houston.

END OF TAPE.

APOLLO 10 MISSION COMMENTARY, 5/24/69, GET 133:25, CDT 0114, 457/1

PAO This is Apollo Control at 133 hours 25 minutes. We're still about 32 minutes from reacquiring Apollo 10. The spacecraft will shortly be beginning its 30th revolution of the moon. We have some additional information from our flight dynamics officer on the relative position of the command and service module and Snoopy's descent stage. The analysis of the relative orbits of the two spacecrafts shows that Snoopy has apprently been or rather the command and service module has apparently been lapping Snoopy, as we said, and we believe that the point of closest approach of the two spacecrafts occurred during the current revolution when Tom Stafford and John Young were describing their sightings of the LM descent stage. Not necessarily at exactly that time, but sometime during that revolution, we believe, the point of closest approach of the two spacecrafts occurred. From now on the orbits, relative orbits, will take Snoopy farther behind - Snoopy, of course, being in a higher orbit, thus taking longer to complete a revolution. The command module will continue to move out in front so that by the time trans-earth injection occurs, Snoopy should be about 5 to 600 miles behind at its point of closest approach. At 133 hours 27 minutes into the flight of Apollo 10, this is Mission Control.

END OF TAPE

PAO This is Apollo Control at 133 hours 56 minutes. We're now about 50 seconds from reacquiring Apollo 10, now in its 30th revolution of the moon. Coming up on this revolution the crew will be involved in some landmark tracking exercises and also will be taking photographs of targets of opportunity. As you heard on that previous revolution, Tom Stafford reported that he had taken a large number of pictures and that the onboard film supply was running low. So we don't anticipate a great deal of photography out of this revolution. We'll stand by now to reacquire the spacecraft in about 10 seconds.

SC Hello Houston, Houston, this is Apollo 10, over.

CC Rog Apollo 10, reading you loud and clear. Go ahead.

SC Hey Joe, we got another little fuel cell we want to throw at you, fuel cell 2.

CC Roger, go.

SC ... the temperature is cycling on fuel cell 2 ... about 155 degrees about. It's cycling 2 cycles a minute. It's been doing this for at least the last 30 or 40 minutes. And one in every 10 cycles it reaches ... on fuel cell 2. In addition I guess maybe we ... on fuel cell 2 and 3 the 02 flow rate dips the gage, it keeps bobbling up and down just in the .01 or so but just enough so the needle goes up and down on a slow continuous ramble on both fuel cells. Over.

CC Okay 10, we copied everything except the band that the temperature is cycling between. It's between 155 and something. What was the other number.

SC It's about 173 and about 155. It's cycling right in the green band and 2 cycles per minute and rings the master alarm on the low side about 1 every 10 cycles.

CC Okay thank you, Geno, we copied all that.

CC Okay 10, this is Houston, we'll monitor -

SC And Houston this is -

CC Go ahead Gene.

SC Go ahead Joe. No you go ahead.

CC Okay, we'll monitor that fuel cell down here the best we can and keep up advised if anything new happens. Also, did you get a chance to look for Snoopy on the back side of the sunrise?

SC No, we looked up there but as soon as the sun comes up it blanks everything and it's real

funny, we had it planted on the spot right above Snoopy but ... we didn't see him at all.

CC Okay we copied that Tom. Go ahead Gene, you were going to say something.

SC I was going to say we got our water dump out of the way a little bit early. We dumped it about 15 minutes ago.

CC Okay, I copied that. We got a power configuration for TEI burn with respect to this fuel cell. Now, this is with the original fuel cell problem, we may want to change it some if we've got another problem. But if you'd like to copy this down I'll read off this configuration for you.

SC Go ahead. And believe it or not, it looks like that continuous cross temperature cycle has not posed its bands on to be about plus or minus 10 degrees, well within the green band, just as we came on here, within the last 5 minutes.

CC Okay, that sounds real good. We'll still keep a close eye on it for you. On this configuration for the TEI burn, this is be for 136 hours. We'd like for you to verify that fuel cell 1 pumps are off on channel 5, and prior to the TEI burn, at approximately 136 hours, place fuel cell 1 on both main buses. And after the TEI burn take number 1 fuel cell off main A main B buses whenever it's convenient.

SC You want it on ... before the burn is that correct.

CC That's correct Gene.

SC Okay. Do you want fuel cell 1 pump off now?

CC Okay Gene, the circuit breaker for 1 is open now, is that affirmative.

SC That's affirmative, but the switch according to what I'm reading here says the switch must be on to enable power for pump is that correct?

CC You're coming through a little scratchy.

SC ... as long as you're going to use the fuel cells for the burn what I read here is that the fuel switch for fuel cell 1 and/or 3 should be left on power pump, is that correct?

CC Okay Gene, I think, if I read you correctly, if we understand what you mean, we're not going to try and activate the pump during the TEI burn. We're going to leave it turned off. So you can leave that switch at whatever it is now if you like. The circuit breaker is

closed. We're just going to bring the fuel cell - we're going to activate the fuel cell. We won't turn the pump on.

SC I don't blame you. We cannot turn the pump on because the circuit breaker will not reset. I'm refering primarily to the switch and I'll leave it - it's been in the AC 1 position. We never did turn it off after circuit breaker 5. And unless you have any other ... just leave it there.

CC That will be fine Gene, just leave it where it is. It's inactivated now anyway.

SC Say Houston, do you read us on high gain, we're getting a semi steering signal.

CC Roger, we're reading you Champ.

SC Okay, I'll stay here then.

CC Okay.

SC Okay, it looks like that oscillation on the condenser exhaust temperature, fuel cell 2 has dimmed up, believe it or not. But I timed it. It was going 2 cycles per second throughout the region and as I said triggering the master alarm on fuel cell 2, but it's stable now.

CC Okay.

SC That was 2 cycles - that was 2 cycles per minute Joe.

CC Okay, we were monitoring some of that oscillation down here but we didn't see quite the width of oscillation that you were seeing, Gene.

SC Okay, I just took it right off the gauge here and that's why I wanted to let you take a look at it now.

CC Okay. And 10 this is Houston, you can terminate your battery B charge now if you want to.

CC Houston, this is 10 again. It looks like I may - I've got Snoopy right out in front of me again. There's something going down from the back, it just went down below. You can see ... 30 seconds ago he was ...

CC Okay Tom, you're breaking up a little bit, I understand about 30 seconds ago he was ahead of you taking in a fixed angle?

SC ... 350. Again he could be a big hunk of ... that's the only thing I can think of that would cause a reflection.

END OF TAPE

SC (garble) I think all of our insulation blew off, at least for awhile. And now it's just (garble)
CAPCOM Roger Tom.
SC It just a (garble) and it's awful hard to tell exactly which (garble)
CAPCOM Rog. Understand, Tom.
CAPCOM Apollo 10, Houston.
SC Okay, we're right near P-1 for this mark. Go ahead; keep it short. Over.
CAPCOM I've got a maneuver pad. Give me a call when you're ready to copy, Tom. I'm sorry.
SC Okay, Houston. Go ahead with your maneuver pad.
CAPCOM Roger, Gene, this will be -
SC Stand by.
CAPCOM Okay, I'm standing by.
SC Okay, we're in between B-1 and flight 3. Over.
CAPCOM Okay, do you want me to hold off on this pad, Tom?
SC Go ahead, Joe.
CAPCOM Roger. TEI 31 SPS G&N 36685 minus 062 plus 089 137 36 2820 plus 36255 plus 00401 plus 01889 181 051 002 NA plus 00212 36306 241 36079 16 1464 294 the next three are NA NOUN 61 minus 1508 minus 16500 12038 36394 191 5043 your stars are Deneb 43 Vega 36 241 240 013 for ullage 2 quads with 14 seconds and use quads Bravo and Delta. Horizon on 6-degree window mark at ignition minus 1 minute. Sextant star not available until 137 06 00. Sun not visible in coas at ignition. Horizon will be lit at ignition. That's the end and I'll stand by for your readback.
SC Okay, Joe. Give me noun 47 again and then I'll read it back.
CAPCOM You want noun 47?
SC Yeah, the first number, the weight.
CAPCOM Roger that. 36685.
SC Okay, that's TEI 31 SPS G&N 36685 minus 062 plus 089 137 36 2820 plus 36255 00401 plus 01889 181 051002 apogee is NA perigee is plus 00212 3606 241 36079 16 14 64 294 noun 61 is minus 1508 minus 16500 plus 12038 36394 191 5043 Deneb 43 Vega 36 241 240013 ignition 14 seconds plus Bravo and Delta horizon is on window ... horizon is on the 6-degree window mark at ig minus 1 minute. Sextant star not available until 137 06 00. Sun not visible in coas at ig and horizon is lit.
CAPCOM That was a real good readback, Gene. That was a full one too. We had all the square ... in that one, right?
SC Full ...

END OF TAPE

CAPCOM Apollo 10, this is Houston. Let's see Gene, I've got a short map update and a photo update, however, did I copy before, that you - you say you are out of film, or you're about out of film.

SC Stand by, Joe. We're in the middle of a landmark tracking. We'll call you all.

CAPCOM Sorry. Standing by.

CAPCOM Okay 10, this is Houston. We observed on your last mark there, that you got four marks and the last one was just past the Nadir. It looks like if you increase your pitch rate just a little bit, you can probably get five marks without any problem.

SC Roger.

SC Houston, this is 10. Over.

CAPCOM Roger, 10. Go ahead.

SC Roger, that first mark - that group was not off what I think is site 150. This low sun angle, you got so darn many craters out there, the grouping don't stand out like they do with - with a high sun angle, and I I'm not even sure that I marked on 150, although it was one of the three craters in there, with pretty high contrast.

CAPCOM Okay, we copy that, John. Thank you.

SC The first mark definitely was not on the - on the site of what I thought was 150. The last four were.

CAPCOM Okay, we copy that. Thank you.

SC Joe, I've got the marks you've got in front of you again. I'm sure that you can say one of the mechanics it must be a big help ... out there in such a sunlight. It's slowing this whole terminator down, and it's held about the same. It's pitch down at a local vertical of about, I estimate, I'm coming up to it now, 330 degrees. It's holding out there at 330.

CAPCOM Okay. Sure understand. You think that's a -

SC Joe, could I have the -

CAPCOM You think that's a hunk of mylar, you say, Tom?

SC Yeah, the data, Joe. Yeah, to be - to be that - that low down with the north and still keep about the relative conditions you got to be, Joe. Over.

CAPCOM Okay, you can't get the monicular on that thing.

SC Joe, - Joe, I'm not going to ask now and to be in sunlight where it is, it has to be awfully close to us and ... And I think it's a piece of mylar, too.

CAPCOM Okay, mighty fine. Thank you.

SC In a while, we go into darkness I think.

SC I'll give you a hand ... about the same time we do, as you can tell here, and I'm pretty sure it's not too far away.

CAPCOM Okay, sure understand. And I understand you're ready for this map update pad.

SC No, let me watch this thing first, then I'll get it.

CAPCOM Okay, give me a call when you're ready.

SC Houston, do you have the data from that landmark? Over.

CAPCOM Roger, we got it.

CAPCOM 10, this is Houston. Jack says that it looked like your last four marks were spaced very nicely over the ...

SC Yeah, whatever it was.

SC Roger.

SC I think that was site 150, but boy, there are a lot of shadows out in that place right now, and I wasn't 100 percent sure that that was site 150 crater.

CAPCOM Okay, we copy.

SC They was darn close to the weather.

CAPCOM Okay.

SC Houston, both those - both those last sites were done with a telescope. I couldn't fix you one of them up with the sextant, the first one was almost dead, it was washed out in the sextant ... sunshine and the second one, I didn't get with all the shadows. I couldn't see anything.

CAPCOM Roger, copy John.

SC It wasn't to find anything.

SC Joe, how are you on your update?

CAPCOM Okay. This is for rev 31. LOS is 1350924, 1352009, 1355530. Now that's all. I'll stand by for your readback.

SC Okay, they're all 135. They go 0924, 2009, 5530.

CAPCOM Roger, that's correct and on this photo update, again Geno, just - did you figure you guys are out of film up there? There's no sense sending it up unless you're all out.

SC No, we're going load this last ... finish the update.

CAPCOM Okay, coming up. descent strip and site 3. 1355924, 1360101, 1361852. Your ordeal angles are roll 180, pitch 282, yaw 000. Bat P1 yaw right 20 degrees P2 yaw left 20 degrees. That concludes and standing by for your readback.

SC Okay, 1355924, 1360101, 1361852. ... in roll 180, pitch 282, yaw 000. Bat T1 yaw right 20 degrees and at T2 yaw left 20 degrees.

CAPCOM Okay, readback's correct, Geno.
SC And are you going to update omni, or you want us to get high gain.
CAPCOM We'd like to have high gain, Geno. We'd like to look at some of the data.
SC Stand by.
SC Houston, are you reading in high gain?
CAPCOM Okay, we got it. Thank you, Geno. And if you'll give us poo and accept now.
SC Okay Joe, you're CMC and accept.
CAPCOM Okay, thank you Tom.
SC Houston, how's your high gain on now?
CAPCOM Okay 10, it looks like we're on Y right now.
SC (garbled)

END OF TAPE

CAPCOM Okay 10, it looks like we're on wide right now.
SC Negative. (garbled)
CAPCOM 10, this is Houston. We're not able to read your transmission here - you're coming through a little broken up and from the data it looks like you're coming in on the scan limit.
SC Okay. Now I think you got it. Go ahead.
CAPCOM Roger. You're booming in loud and clear now. And we got good data now, Geno.
SC Okay.
CAPCOM Apollo 10, this is Houston. The computer is yours. You can go back to block now.
SC Roger, we're in block.
SC Hello Houston, Apollo 10.
CAPCOM Roger, go ahead 10.
SC Okay. We're loading the DAP to set up for TEI. We've got the two jet ullage set up for B and D and +X translation in register 1 if you're reading our DSKY. Okay now for register 2, just to re-affirm you, we're going to use B and D roll too. Over.
CAPCOM Roger, that's affirmative.
SC Okay. You know we want to activate quad D though. Is there any quad we want to have fail there in register 2 other than use BD in the first digit? Over.
CAPCOM Okay Tom, we do not want to fail any quads. We want a zero and four ones in there.
SC Okay. That's what we thought.
SC Hello Houston, this is 10.
CAPCOM Roger. Go ahead 10.
SC Okay. It looks like our condenser exhaust temperature once we come into nighttime is now starting to cycle again. It's starting slowly. You can watch it from where you are, I guess.
CAPCOM Okay. We'll monitor it down here Gene. Thanks for alerting us. And also, Tom, just to remind you, we want you to enable all the auto RCS for your burn.
SC Roger. You want all auto RCS - that includes AC for roll too? Over.
CAPCOM That's affirmative.
SC Say again.
CAPCOM That's affirmative.
CAPCOM Apollo 10, Houston.
SC Go ahead.
CAPCOM Okay. On your fuel cell there we're monitoring this power output on 2 and 3 and the load sharing appears to be normal although we are monitoring this change in temperature on the condenser exhaust. We're showing about -

CAPCOM - Oh, it's grown to about an eight or nine degree spread now; however, it doesn't look like we could recommend any kind of changes right now. We'll keep watching it, though.

SC Okay Joe, thank you.

END OF TAPE

SC Houston, this is 10. What's your temperature on that exhaust temperatures ...

SC Hello Houston, 10.

CC Roger 10, I was just getting those numbers Geno. The lower limit is 149.5 and the upper limit is 177.

SC You mean it's going from 149.5 to 177.

CC I'm sorry, I misunderstood you, what we're reading is some about a 154.2 or so up to 167. The limits where you are liable to get a light is 149.5 to 177. Over.

SC Okay thank you Joe. You're reading about the same thing I am, I guess. I expect the light here about a minute and a half after I lose you.

CC Okay, I'll tell you Gene, we've been monitoring the cycles here. The oscillation there, it looks like it opened up to about a 15 degree - 14 or 13 or 14 degree spread. And it appears to be holding that pretty steadily and it's going up and down between about the same limits. Is that about what it looks like to you?

CC Apollo 10, Houston.

PAO This is Apollo Control. We've had loss of signal now. We'll be reacquiring Apollo 10 in about 43 minutes. The spacecraft at that time will be in its 31st revolution. During that revolution we'll be passing up the information that the crew will need for their transearth injection maneuver. That burn is scheduled to occur at 137 hours 36 minutes 28 seconds and, of course, will take place behind the moon. While we're out of contact with Apollo 10, the burn duration is currently planned at 3631 feet per second with a burn duration of 2 minutes 41 seconds. During that last pass on rev 30, as we reacquired the spacecraft Gene Cernan came on to advise that he had noticed a temperature cycling in fuel cell number 2 in the condenser exhaust temperature. This was cycling he said between 155 degrees and 173 degrees. Later he reported that the cycling had reduced, the temperature range had stabilized and the fuel cell temperature had become stable and as the spacecraft moved into darkness again, near the end of the acquisition period, Cernan reported again that the temperature was beginning to fluctuate. We were also able to monitor that temperature fluctuation here on the ground. The temperature range was cycling on the order of 10 or 15 degrees, ranging from between 153 to around 165 or 68. There's no concern about the temperature on the low side. The temperature range on the high

side can get up to around 200 degrees before there is any concern with that particular temperature. We'll continue to observe that parameter in the fuel when the spacecraft comes back around on the 31st revolution. At this time it does not appear to be a problem. The EECOM, the electrical communications engineer reports that the fuel cell appears to be functioning normally in all other aspects, that is sharing the load as it should and that its power output is absolutely nominal. As 135 hours 15 minutes this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 135 hours 55 minutes. We're less than one minute now from acquisition of Apollo 10. The spacecraft now in its 31st revolution of the moon. This will be the last full revolution prior to trans-earth injection beginning the trip back to earth. During this upcoming revolution the crew will be involved in getting the spacecraft and the guidance system configured for the trans-earth injection maneuver. And we'll be passing up the pad information for that burn. We should have acquisition now. We show that we have data from the spacecraft. We'll stand by for voice communication.

CC Apollo 10, this is Houston.

SC Go ahead, over.

CC Rog, 10. I've got a bunch of updates for you. First off, though, I would like to have you turn on your H2 purge line heater and we would like to have POO in accessed on the computer.

SC You've got it. What kind of updates, Joe?

CC Okay, I've got a maneuver pad update and Geno this is for TEI 31. There are 6 items that have changed that we have different numbers for. Would you like for me to just call up those changes, do you want me to read the whole pad?

SC Why don't you call up the changes and I'll read back to you the whole pad?

CC That'll be great. And let me know when you're ready to copy.

SC I'm ready but give me a lot of time between each change.

CC Roger, sure will. I understand. Okay, then on your maneuver pad, this is for TEI 31. Under noun 33 the time is -- on second -- is 2821. Okay for noun 31.

SC Go ahead.

CC Roger. Noun 81. plus 36252, plus 0.

SC No.

CC Okay. Delta Vy is plus 00400. And delta Vz is plus 01880. Okay, you're delta Vt is 36303. And delta Vc is 36077. And that concludes all the changes. I'll stand by for your read back, Gene.

SC Okay Joe, I'm going to read back the whole pad to you.

CC Roger.

SC TEI 31. SPS A&N. 36685, minus 062, plus 089137362821. Noun 81 is plus 36252, plus 00400,

plus 1880 -- correction -- plus 01880. Roll is 181. Pitch is 051. Yaw is 002. Apogee is NA. Perigee is plus 00212363032413607716146429 4. Noun 61 is minus 1508, minus 1650012033639419150 43 ... omega 36 on the set start. Roll is 241, pitch is 240, yaw is 013. For unity two jets for 14 seconds gives quads bravo and delta. The horizon is on the six degree window mark and peg minus one minute. The sextant star is not available until 1370600. The sun is not visible until after .... Over.

CC Good read back, Gene. That's all correct.

CC Okay. Apollo 10, Houston. We'd like for you to put fuel cell one back on main A and B please.

SC Okay fuel cell one's coming on main A and then main B.

CC Okay, and I've got a TEI 32 maneuver pass for you Gene. Preliminary.

SC Standby.

SC Houston, it should be on the line right now. It's turning not quite ... when I put it on I got the fuel cell bus disconnect reconnected and it stayed connected and the same thing on bus B. It looks like it's warming up slowly.

CC Okay 10, we copy all that and it looks okay down here.

SC Okay. And you want to give me a TEI what? 32?

CC Affirm. 32.

CC Okay. And prior to this pad, 10 you can go to block on your computer. You can have that back, now. And coming up with TEI 32. SPS G&C. Your first entry is noun 33. 139362514, plus 37573, plus 00292, plus 00841. Pitch is minus 050. All else is NA. Ullage will be two jets for 14 seconds. That concludes and I'll stand-by for the readback.

SC Okay TEI 32 and SPS G&N. 139362514, plus 37573, plus 00292, plus 00841, pitch minus 050. Two jets for 14 seconds.

CC REad back correct, Geno. Okay I've got one more ---

SC Okay Houston, while we're taking this strip photography we're going to --

SC Go ahead.

CC Okay. I've got one more TEI map update and I'm sorry to cut you out, Tom. Press on with what you were going to say.

SC You didn't send us the maneuver load, did you? Don't worry about the map update.
CC Okay. Roger that.
CC 10, this is Houston. We send up a state vector and a target load external delta V.
SC Yeah, we got it.
CC Roger.
CC Apollo 10, Houston. Geno, did you notice about the same kind of excursion on your temperature on your fuel cell this time on the back side?
SC All the way Joe, exactly the way it was the previous time. Only we never did get the master alarm this time and when we came out in the sunlight, she seemed to slow down and it's okay now. We also found something. It was this light oscillation in the 02 needle on both 2 and 3, but it's gone now, too.
CC Okay we copy that and that's just on the dark side of the moon, is that affirmed?
SC It occurs after we had gone into darkness about 15 minutes and then apparently very shortly after we came out of the sunrise, it starts damping out.
CC Okay. Understand.
CC 10, this is Houston. What are you showing for yaw now?
SC Roger. We're making this in a different attitude than what was called up to us here. We only have just a couple of film shots left. Over.
CC Mighty fine, Tom. Thank you.
SC Don't worry about it. We've already got a lot of pictures of this solid site.
CC Roger. I understand.
SC Tell Joe to have a cup of coffee and just relax.
CC Okay Tom.
SC We got more pictures of Censorinus than you can shake a stick at. In fact, I'll be supprised if there will be anything left to take a picture of up here much.
CC Jack says that that's a highland dike, John.
SC You got me there, Joe.
CC Okay 10, this is Houston. In your flight plan when you go to your TEI attitudes, we're going to recommend omni delta. Omni delta.
SC Roger. Omni delta for attitude there - pitch is 052.

CC Affirm.
SC Okay. As soon as we get into that attitude I'm going to turn all auto RCS thrusters on. Over.
CC Okay. Fine Tom. And for your info, we'll have LOS this pass at 1370753 and AOS with your TEI will be at 1374526. And with no TEI we won't get you this, but for your info it'll be a 1375403.
SC Okay and when is LOS again?
CC 1370753.
SC I like your atta boy attitude Joe. We'll see you at 4526, huh?
CC Roger that.
SC And again, just over this maria area here, this area is definitely a brownish tan. And up there in the highlands it is a light tan and the new craters look like Egyptian colors - been around an Egyptian mine. Over.
CC Okay. We copy that Tom, thank you.
SC Anyway, that tube ought to give the true pictures, whatever it is. True colors.
CC Yeah, the colors we've been seeing on that are just exactly as you've been describing them all the way through - all the way from the white to the browns and the blacks and when you talk about the brownish grays and deep grays and blacks, why it looks just like that on the tube.
SC Rog. Good show. One good thing after TEI and we give you all the report, we're going to away so we can slip back at it and take some motion pictures of the moon. Then we'll begin our relax time and we'll flip the tube on for you and we'll see what it looks like in total color going away, but I hear we're going to be through Honeysuckle - is that right? Over.
CC That's affirmative. We're coming through Honeysuckle, Tom, and I guess they're going to be watching you coast to coast for the first program of that type over there too.
SC Okay. Have they got color over there? I say there down below.
CC I guess they're black and white over there Tom.
SC Okay I'm afraid ... the station can't receive it and everything.
CC Roger that.
SC Okay. Good show.

END OF TAPE

SC Okay, Houston. Apollo 10. We're coming up on the Highland areas and, in my general observation, even when we were down at 50 000 feet, and yet you do have some rough terrain here, but it doesn't appear as sharp featured or as rugged in a lot of places as on the back side or over this Highland area, as the lunar orbiter photos showed. Over.

CAPCOM Okay. We copy that Tom.

SC And that's all free independent conclusions. Over.

CAPCOM Roger. Understand.

SC A real rough area is over past the St. Theresa where you have strictly a volcanic area, you have these little cones all tossed up. But out here it's just a highland area, yet you've got a lot of smoke streaks, but they're definitely not as rugged as what is shown there in (garble).

CAPCOM Rog. Understand. Looks like you could find some places to put down in there. Is that affirmed?

SC Roger. Well, I don't think Charlie could push me enough to get back on the ground on that one. Without the Mare area, you'd have awfully sorry (garble) But ... ... that's ... with 25 to 35 percent ... We're in pretty good shape.

CAPCOM Rog. Understand.

SC Say, as - as a matter of fact, for Jack, I'm looking right down at Sasserides from 60 miles up and you can see the boulders on that outer edge. And the shadows from the boulders.

CAPCOM That's pretty amazing, Tom. Those must be pretty good sized rocks down there.

SC Yeah, you could make a building or two out of each one of them.

SC We could drop an apple core right in the hole down there.

CAPCOM Roger.

SC Okay, we're passing over site 2 for the last time around. Over.

CAPCOM Roger.

SC Alright Houston (garble) on a purge here. (garble) I looked for it in the flight plan and I don't see it.

CAPCOM Okay, did you say a purge, Geno.

SC Did you tell me to put the H2 purge line heater on?

CAPCOM Rog. We wanted the purge line heater on. We anticipate purging number 2 here shortly. We don't want to do it just yet, though.

SC Okay, I'll put (garble)

CAPCOM Roger. We do want the heater on though, Gene.
SC It's been on 20 minutes now.
CAPCOM Very good. Thank you.
SC No you sure don't have any trouble telling a hole from the hills down there.
CAPCOM Roger.
SC Like you do in some of those pictures.
SC Right now we're on top of ... and Rheita looking down on the dark shadows of ... Schmidt there, but you can see the landing on the wall and one or two possible big boulders down in there. You know in the pictures it shows them as (garble) dark shadows down below ...
CAPCOM Roger.
SC Okay, we checked the P-30 and it (garbled) and we've got the spacecraft configured (garble) otherwise we got select switches and everything strapped down, so we're (garble) going through it now ... (garble) so as soon as we finish this strip on the landing site here, we're going right to it. 050 (garble) put a high gain on (garble)
CAPCOM Roger. Understand, Tom.
SC And we have landing site 3 coming up right ahead. It's also marked by the craters around it.
CAPCOM Roger, Tom.
SC (garble)
SC In the area for landing site 2 and site 3, ... the highlands area (garble)is definitely (garble) a lot of volcanic action. You can see it all over. You can see the old impact (garble) volcanic activity (garble)
CAPCOM Roger, okay, Apollo 10 this is Houston. We'd like for you to go ahead and purge number 2 fuel cell now, for 2 minutes. And we'd also like to have the high gain antenna as soon as you finish this photography. Over.
SC Okay ... 64 coming at you. We'll start - say you want the fuel cell 2 purged (garble)
CAPCOM Roger fuel cell 2 purged for 2 minutes. That's the hydrogen purge.
SC That's a hydrogen purge, right?
CAPCOM That's affirmative, Gene.
SC The purge is started.
CAPCOM Roger.
SC Hello, Houston, are you reading us?
CAPCOM Roger 10, this is Houston. Read you now, Gene.
SC Okay. Got all the tracking, there okay. About 3 quarters to go (garble)

END OF TAPE

SC Okay, got all the tracking here okay. About 3 quarters signals ... (garble)
CAPCOM Roger. Understand.
SC Okay, Houston. I'm going to go ahead and maneuver the TEI attitude and find the pitch. Over.
CAPCOM Rog. Understand, Tom.
CAPCOM 10, this is Houston. Tom could you hold off on that attitude change for awhile. We'd like to watch this purge until it's complete.
SC Okay. I want to have John get that P-52 IMU.
SC and that's 2 minutes on the purge. How's it look to you?
CAPCOM Okay. We're not getting the data down. The high bit rate on data down, Gene.
SC Okay, Houston. please ...
SC Okay, tell me what you want to do.
CAPCOM Okay, Houston. Please defer it so - go ahead and maneuver to your attitude that will be fine.
SC Roger.
SC Okay, the burn's complete in the H2 verb ... (garble)
CAPCOM Roger. Understand. Thank you, Gene.
SC Houston, How do you read us?
CAPCOM Rog, 10, this is Houston. We're reading you okay. Go ahead.
SC Okay, just wondering, Joe. I'm just playing with the omnis the ... omnis until we get to the final burn attitude. Then you recommend Delta.
CAPCOM Roger. That's affirmative. And did you go all the way through P-30?
SC We stopped before we got the final countdown. It was over an hour at that time.
CAPCOM Okay.
SC We got the Delta V's. Over.
SC Hey, Joe. Did you want us to go all the way through P-30?
CAPCOM Rog. I guess - it appears down here that you didn't get your external Delta V flight set, John.
SC Yeah, we ...
SC We didn't go through it.
SC We're going through it as soon as we finish this P-52.
CAPCOM Oh, okay. Mighty fine, then. I'm sorry.
SC No, but we're getting ready to go through it again. We just wanted to check - Joe we just wanted to check and since you had the values loaded in there

SC — and we got a comp out of it, you know we understand.

CAPCOM — Okay. Sorry about that ... ...

CAPCOM — Apollo 10, Houston.

SC — Go ahead.

CAPCOM — Roger. Gene, are you on high gain antennas, now?

SC — That's negative. I'm on omni bravo.

CAPCOM — Okay. Thank you very much.

END OF TAPE

SC Houston, this is 10. I'm going to leave fuel cell 1 on the line until we come around the corner so you can take a look at it and then we can talk about taking it off.

CAPCOM Okay, that'll be fine, Geno, thank you.

PAO We're now about 30 minutes from loss of signal. You heard Gene Cernan report that the spacecraft is configured right now with the omni antennas which accounts for the somewhat noisy communications we're getting. Apollo 10 is currently at an altitude of 64.6 nautical miles approaching apogee, which we now show at 68.8 nautical miles, the spacecraft orbit perigee is 52.8 and the orbital weight of the command and service module is 36 685 pounds. At the present time, the Apollo 10 crew is involved in a program 52 platform alinement. The purpose of this is to get the stable platform alined in preparation for the transearth injection maneuver.

SC Hello Houston, Houston, this is 10, how do you read?

CAPCOM Roger, Geno, reading you loud and clear. Go ahead.

SC Okay, how's that ... been looking to you?

CAPCOM Okay, we're watching it. It's looking good, 10.

SC Okay, we went through P-30 all the way and now we're just going to do a ... manuever over to the attitude and then we'll go into call P-40. Over.

CAPCOM Okay, copy. Will monitor.

CAPCOM And, 10 this is Houston. I've got some attitudes for your post TEI TV if you'd like to copy them down.

SC Stand by.

CAPCOM Roger.

SC Okay, Joe, go ahead.

CAPCOM Okay, this will be for time 138 00. Use the hatch window, and your attitudes are roll 180, pitch 293, Yaw 000, and we'd like the high gain antenna angle pitch minus 58 and yaw 005. Over.

SC Okay, for a time of 138 00, want the hatch window, roll 180, pitch 293, Yaw 000, and pitch minus 58 and Yaw 005.

CAPCOM I believe that's correct Gene.

SC And, Houston we ... the auto RCS switch is on. Do you concur?

CAPCOM Roger. Concur, 10, thank you.

SC Houston, this is 10. I'm going to cycle the cryo fan.

CAPCOM Roger. Concur.

END OF TAPE

PAO We're now 16 minutes 30 seconds from losing contact with Apollo 10. The flight Director, Milton Windler has requested that his flight controllers to take a look at all the spacecraft systems and we'll be coming up shortly with the go/no-go for trans-earth injection. Flight controllers report all systems GO for TEI.

HONEYSUCKLE Honeysuckle signal minus 145.

PAO We're coming up now on 10 minutes to LOS. The Guidance Officer here in the Control Center -

CC About 10 minutes until LOS and at this time everything looks GO for TEI.

SC Roger, we're going to call up the P40 after 4 minutes LOS.

CC Roger, understand.

SC Okay Ray, the auto maneuver in P40. We're all up there and trimmed up.

CC Roger, we copy Tom.

SC Houston, could you give us a contact at 35 seconds countdown?

CC 10, say again please.

SC Roger, we'd like a contact around 35 minutes countdown?

CC We'll have to give it to you a little before that John. We show about 6 and a half minutes to LOS and you're about 44 minutes. Okay, I'm sorry we'll get it for you.

SC Countdown the burn, Joe.

CC Roger, 10.

CC Okay, 10, this is Houston. I can give you a count down to 34, will that be okay?

SC That will be fine.

CC We're showing 3412 now. 5, 4, 3, 2, 1, mark, 34.

CC And 10, this is Houston. Did you get that, or would you like another countdown?

SC We got it. Give us a mark for 33.

CC Roger.

CC Okay, 33 coming up in 4, 3, 2, 1, mark 33.

SC Roger, we're synced right on.

CC Very good, Tom.

CC 10, this is Houston. We're showing about 4 minutes until LOS and then - fuel cell 1 is looking good right now. Everything looks good for TEI.

SC Roger, we're go here and I'll see you on the way home.

CAPCOM You bet your life. We'll see you in about 41 minutes.

SC Okay.

CAPCOM Okay, 10, Houston. We show 2 minutes until LOS. We're still go; everything looks good.

SC Roger, we're all set here and we'll check the boresight star setting, over.

CAPCOM Roger.

PAO And we now have LOS, loss of signal, as Apollo 10 has gone around the corner of the moon. When next we hear from the crew they should be on their way back to earth after some 61 hours 40 minutes. Just to recount the information for the transearth injection maneuver, ignition is scheduled to occur at 137 hours 36 minutes 28 seconds. The burn duration will be 2 minutes 41 seconds. That should give the spacecraft an added velocity of 3630 feet per second. The maneuver will occur at 155 degrees 43 minutes East longitude, which will be on the back side of the moon. And with the burn performed properly, we should reacquire the spacecraft at 137 hours 45 minutes 26 seconds. As the spacecraft went around the corner of the moon, as we lost contact, all systems were looking good, all three fuel cells are on the line and performing normally at this time. At 137 hours 9 minutes, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 137 hours 36 minutes. We're now less than 1 minute from the time at which the Apollo 10 crew will be igniting their 20 500 pound thrust service propulsion system engine to start them back to earth. At this time, the crew should be completing last minute checks of their guidance and navigation system. They should have gotten the spacecraft into proper attitude and checked that attitude against stars. At about 35 seconds prior to the engine ignition, their computer display panel will blank briefly. They'll then follow that with some last minute checks of the accelerometers in the guidance system. At 14 seconds prior to ignition, two of the RCS reaction control system jets will come on to settle SPS propellants. And at minus 5 seconds a flashing light on the DSKY, the computer display panel, will request the crew to enable the engine for ignition, if all is go at that point. John Young will punch a button to proceed and the engine will ignite on schedule. We now show 25 seconds to ignition. Coming up on 30 seconds now to shutdown. And at this point the SPS engine have shut down, Apollo 10 on its way back to earth. We should reacquire, we should acquire the spacecraft in about 9 minutes from now. We anticipate that when the spacecraft comes around the corner of the moon on its way back to earth, the crew will have the television camera on and we would hope to have television pictures of the moon receding in the background. Now this television will come to us from the site at Honeysuckle, Australia, where we'll be using the 85 foot dish antenna at this site. This introduces the possibility that the signal will not be as strong as the reception we would get on the 210 foot dish at Goldstone. However, tests have shown that this should be adequate. We're coming up on 1 minute to acquisition of signal. Flight Director Milton Windler has asked his flight controllers to stand by to get a first look at the spacecraft systems as Apollo 10 comes back around the other side of the moon enroute to earth, and we're coming up on 30 seconds now to acquisition of signal. And we should have acquisition of signal shortly. There is the word, AOS flight. We have telemetry data, we're standing by for voice communications from the Apollo 10 crew.

CAPCOM Apollo 10, this is Houston. We are standing by.

SC Hello Houston, Apollo 10.

CAPCOM Hello Apollo 10, this is Houston. How did the burn go?

SC Roger, Houston, we are returning to the earth. Over.

CAPCOM Glad to have you on the way back home, 10.

SC Roger, the burn was absolutely beautiful and Geno has a report, and we have a fantastic view of the moon now. Over.

CAPCOM Mighty fine, Tom, standing by for that report.

CAPCOM Hey, Joe. You've got (garbled) for that (garbled) update. Here it comes: Burn was on time, it was 2 minutes and 44 seconds. Residuals were plus .3 which we reduced to .2 plus 1.6 and minus .2 DELTA-VC is minus 19.9 Fuels remainig is 6.7 percent, oxidizer of 9.2 percent. My (garbled) is reading off scale high on the increase. I put through the procedure but apparently it did no good at all. It's still reading full scale increase on the parts, and my oxidizer flow valve is still in increase at the completion of the burn.

CAPCOM Roger, 10, we copied all of that.

CAPCOM 10, this is Houston. We'd like to go ahead and take that fuel cell 1 off both busses now.

SC It's going off right now, Joe.

SC Houston, the TV is being turned on now, and as Tom is starting to pan we have a couple of quick short words for you.

CAPCOM Roger, we're standing by. Go ahead.

SC MUSIC: "GOING BACK TO HOUSTON"

CAPCOM Roger, 10, this is Houston, we copied that transmission. Thank you.

SC Glad you got the message.

SC Boy, this view is going to be a fantastic thing.

SC Houston, 10, I hope the office has their sets tuned in because it's utterly fantastic here.

CAPCOM Roger that, Tom, I'm sure they're all watching.

SC We are taking a picture right now of Tsiolkovsky down south there. That's (garbled).

CAPCOM Roger, copy.

SC What a place.

END OF TAPE

CC Roger. Copy.
SC What a place.
PAO And we have a black and white signal at this point.
SC Joe, that's Tsiolkovsky back there. It's big and black and very distinguishable. Fantastic. Incredible.
CC Rog. We can see it pretty plainly on the set. That's the one right up near the horizon. Is that affirm?
SC It's just on the horizon; way out there. Right.
CC Hey, there you go. Now we're picking it up. We can see into it now.
SC We can see the whole of the Smyth's Sea now. That's it, Joe. That's full zoom. You oughta be able to see that real good.
CC We can. That's just real good, Gene.
SC I can see the whole of the Smyth's Sea and I see old F1 down there. Got this big ... crater up on the northern horizon. They are going to try and put that on the tube. Boy, that's a big one. The rays of Schmitt Crater go all the way across the moon. Must be new.
CC What's your F-stop setting on the camera now?
SC Roger, Joe. I've got it at 22. The moon's awful bright.
CC Roger that, Tom. Thanks.
SC I'll occasionally flick it up, down, and then back to help saturate the tube, but that's what you see, there. Okay, we're taking all kinds of pictures. I've got the tubes, Geno has the sequence camera, and John has the Hasselblad. We're getting all this documented. Is that better, Joe?

CC Yeah, that's a little bit better, Tom. That's great. The detail is coming out a lot better.
SC Okay. Again, as we move away, the basic moon looks tan to us. The new craters are definitely white from the impact and some of the volcanic ones; but from this sun angle, it's basically tan out there - a white, white tan. And the rays you can see are even whiter. And moving over this way, the one crater you can see over there is a brownish color with the one central peak in it. I'll try to put the zoom on it for you.
CC Roger, Tom. We're picking it up now. We can see the central peak in the crater.
SC Okay. Do you have any color there at all, Joe?
CC Say again, Tom, please.

CC Say again, Tom, please.
SC Roger. Do you have color in Houston, or just black and white? Over.
CC We got color here in Houston. There's quite a bit of light for the color, although we can make out the crater and we can see the central peak in it. The black and white is coming out real good.
SC Okay. What I'm looking at now is a brown and the peak into it is a light tan - around it is a little darker tan. Does that correlate with your colors? Over.
CC Roger. That looks real good on the monitor here, Tom. That's just what we're seeing here.
SC This is absolutely incredible. I thought it was a fantastic view leaving the earth, but it is going to be even a more fantastic one leaving the moon here and heading back to the good old earth.
CC Roger that, Tom.
SC I got the whole of the Smyth's Sea. Okay, the way you see it right now is about F-50, maybe 55 on the zoom. That's about the way we're seeing it now, maybe a little more.
CC Roger. Understand.
SC Okay, I'm handing the camera over to John here and he'll show you the Sea of Crises. Over.
CC Roger. And while you're doing that, Tom, we got confirmation on your burn. It looks like we'll have about one foor per second at your first MCC at 15 hours.
SC Rog. I think we can afford about one foot per second. That isn't bad.
PAO Apollo 10 now 711 miles from the moon.
SC Yeah, the old guidance system is doing great work for us on this mission.
CC Roger that. That's a real interesting picture that you're showing us now, too.
SC And also for the first time we're seeing I guess, what Gene termed a gigantic turtle-backed crater that's fractured. We'll put the zoom on that in just a minute.
CC Roger.
SC There's a real interesting crater here on my right, Joe. It's an enormous thing and it's fractured almost symmetrically in a number of pie-shaped pieces. Let's see if we can get it for you in a minute.
CC Okay, we're standing by.
SC In fact, looking straight ahead, just now coming into view, even though we're really starting to climb out from it - in fact, I can finally see the whole moon right in the hatch window. But working down the road, there's Messier A and B, the Taruntius Twins. We have Censorinus there for Jack. And on up ahead I can see landing site one even

from this distance from the landmarks on that end. Over.

CC Roger. Understand. That's real good to know.

SC Boy, you can't believe this rate of climb. It looks like we're just going out vertically. Just beautiful. It would scare the heck out of you if you came near it this way, but maybe it was just because we came in dark and didn't see the thing. Over.

CC Roger. Understand.

SC Hey, Joe, that's that crater I was talking about. I don't know how that is, but I can see a little bit of it in my monitor.

CC It's coming in real good, Gene. It looks like you're just about to drown the top part of the window there, but we've got the whole crater, and yeah, we can see those fractures in there.

SC It looks like the outer rim is slumped down and you have some maria material near the edges and the whole thing is fractured there in the middle from a couple of impacts near it.

CC Roger. We can make it out.

PAO Spacecraft now some 850 nautical miles from the moon.

SC Okay. Down in the central part here it's still a tan color and as we move further away, it's starting to get a little more white and the maria areas are turning to a white, light brown - a whitish brown. Over.

CC Roger. Understand.

SC Kinda looks like the real moon.

CC Roger. The crater that you were show -

SC It's a little rounder, too, isn't it? Go ahead, Joe.

CC Rog. Gene, I was just going to say that crater you were showing us, your fractured crater there, it looked like there was a dark patch on the left-hand side. I wonder if that was just something that showed up on the tube or if you observed that up there.

END OF TAPE

PAO Was there something that showed up on the tube, or have you observed that up there? In the upper left-hand corner there now?

SC It looks like maria material. That's right, maria material in that crater, Joe. Over.

CAPCOM Rog, that's real interesting.

SC Just wait till about another 30 minutes. Bet you'll be able to see the whole thing then. Over.

SC Get you to do it again boy; what a friend. Does it look a little rounder?

CC Rog - looking real round now. When you guys get half a chance, see if you can give us ACCEPT on the computer, we'll shoot you up a new load.

SC That sounds good. We are POO and ACCEPT; you got it.

CC Roger; thank you.

PAO Altitude 930.

CC Hey it looks like you guys are climbing out of that.

SC Roger; you better believe we're climbing out; just like we're in a vertical cloud going straight out from the center; its a fantastic sight. All for the record I was just looking here, its a beautiful beach but where's the ocean; over.

CC (laughter) Rog.

SC Okay, I've gotten the camera back in the central window again. It sure is incredible; that thing is getting rounder and rounder and rounder and smaller all the time.

CC Rog - understand.

SC The real show is on the inside here; like 3 monkeys in a string pod.

CC Yeah, I'll bet that's right.

SC Tell you what you see out there is real close to what we have; maybe the curvature is a little more; now one thing real interesting; you see the two dark spots there in the center of your screen ...

SC I've got them.

SC Okay - now all 3 of us are correlating this as a light brown color and surrounding it you have the highland areas there which is a tan color and you can see one impact spray crater up there that's a white chalky color, that looks just like the material gypsum.

CC Roger; we're getting the same colors that you are describing Tom; it's just great; fantastic.

SC Okay, I've got another crater over here; ... is to the right of it ... and you can see it, its

real bright with a blaze coming out of it and I'll ... on it.

CC Roger.

PAO Apollo 10 now 1060 miles from the moon.

CC Okay, 10, this is Houston; you can go back to block on the computer; its yours and the fuel cells are looking real good and you might be ineterested to know you are coming in real great all the way across Australia.

SC Well - to the people of Australia from the crew of Apollo 10, we'd like to say good morning; we've seen your country many times on the way up to the moon, and we'll see it many times on the way back; it looks very beautiful from even 210 000 miles out; over.

SC That Tommy is a charmer.

CC I'd should say.

SC Hey the moon is almost small enough now where I can see the whole thing from the top, one corner of my forward window to the other corner of my forward window.

CC Roger; understand.

SC I can see the whole moon from top to bottom in my forward window.

CC Roger; understand Gene.

SC Looks like the camera is doing a pretty good job here, zooming in and out ...

CC You guys are really hauling the mail out of there.

SC You better believe it. We're climbing straight out Joe - its a fantastic sight; its like we were shot straight out from the center of the moon.
Is that what you call it Joe?

SC That's what we call it tonight - you're going about 6 000 feet per second. Okay, we'll pick you up, more of the mylar ... and I can't hear it from this distance; but still keep the recording going, it is a brown in the maria area, surrounding area is a light tan; in fact, I've got one crater I'm gonna try to zoom on, see the maria area on the left side of your screen now?

CC Roger; over.

SC Okay, up in there is a little rather small maria area of round spring ... let's see if we can zoom on that spring crater there.

SC Roger: okay.

SC You know that ... crater that had me back to carry off on the left side is oh, about one fourth of the bottom radius side; you're not looking at it now, but ... inside, its all full of ... dark gray material also.

CC Roger, copy 10.

SC In fact right now all the people watching the TV are at an advantage because what you see in your screen is a bigger image of what we see, and see that little white crater that I put down there about the center of the screen?

CC Roger.
SC The white chalky material, surrounded in some tan, and then around the base maria over here on the right, and that is brown; over.
CC Roger; thank you Tom. That's maria over on the lower right - is that chalk brown or is that black?
SC No, no, the maria here that is right in the middle of the screen now Joe - that is a brownish color, estimate a light brownish color with slight streaks of tan over it that put that up from the wide crater, this one is coming up right here, I'll put the zoom on it. You see that Roscoe?
CC Roger - we got it.
SC Okay - the crater that you have now - the inside of that is chalky color, the rays coming out are light tan, a darker tan surrounds it and then you move into the maria which is a maria color; over.
CC Okay, we got all that ... and boy that little crater with its raise sure stands out nice.
SC Roger, and you can see down into it, and the sides are just a chalky white color, the bottom is a tan like we've seen before, so really its a white/tan, but the raised ... but going over to the maria you can see the raise in the maria material there, a light tan over a brown; over.
CC Roger; we understand.
SC Hey Joe, down at 9 miles has to be exciting, but this has gotta be unbelievable. The moon is now well within the boundaries of my forward rendezvous window. And now that we're showing you that crater, just one thing I wanted to check - does our description of the color match with your picture down there; over.
CC Roger - it's coming up pretty good Tom - the maria area that you described as brown looks a very dark brown here, almost black, a real dark brown, and evidentally that's a little lighter to you than it shows up on the screen.
SC Yeah, okay. What about the tans; does that seem about the same, over.
CC Roger; that's looking real good, in fact, Tom, I'm at a little disadvantage; I'm looking at the big screen here on the board and they say on the monitor and in the back of the room there that the colors are exactly as you are describing them.
SC Okay - I passed my eye test I guess the last time before the T minus 4 day physical so I guess they haven't gone too bad. This is an interesting crater right here; looks like a lot of them form a big crater, then you have sloping in the walls, here you can see a series of ridges where the walls are slumped down in, and I'll zoom in a little bit; over.
CC Roger.

SC Okay, and the whole view now is getting so fantastic I'm gonna go out to the wide angle to show you what we see - I can see the whole moon right out the hatch window.

CC Roger.

PAO That view from 1400 miles -

CC Oh, that's beautiful.

SC Yeah, there it is. See what I mean about size, Joe, it just about fills up, round wise, right smack in the hatch window. Boy, and is this a swell mode -

END OF TAPE

SC Boy, and is this a full moon, I'll tell you.
CAPCOM You're just about 1400 miles out now.
SC (garble) Roger, 1400 miles out from the burn and the view is actually just incredible like Gene has described. We're all just looking up here. Just looking at it, again, as we've said before, it's a good thing we came in backwards at night-time where we couldn't see it - because if we came in from this angle you'd really have to shut your eyes, over.
CAPCOM Rog, understand. Tom, how about going to the other position on ALC and let's see how it looks.
SC There's the other position. Joe, we've been shooting this whole thing in f/22.
CAPCOM Rog, understand. Okay, that's good, Tom, go on back to - let's see, I imagine -
SC We're going back to (garble). We're on the outside now, Joe; how's that? That's where we were. We just went inside for (garble).
CAPCOM Roger, that's a lot better. Stay on the outside.
SC And again, this whole area looks - that mare material is brownish and still the color hasn't changed much. It's brown and tan with lights, over.
SC Hey, Joe, with a midcourse of a foot a second we must be in that corridor.
CAPCOM That's pretty close.
SC Boy, that's absolutely incredible, targeting down there. Congratulations.
CAPCOM You can almost begin to start smiling, can't you?
SC (garble) back home. Yes. I'll bet Phil Shaffer has a smile across his face if he's around, over.
CAPCOM Yes, he's in a room down the hall. But I'm sure he's grinning.
SC Well, (garble) have one on me.
CAPCOM Roger, will do.
SC How come all you people are up? How come all you people are up this early in the morning?
CAPCOM That's normal working hours, Geno.
SC All right, I'll try to pick you out a couple more interesting characteristics. Again, you can see that one sprayed crater up to the side. Actually, here's a better view. I can see the landing site coming in now, and we'll go down and take a look at Messier, Messier B, the Taruntius twins; we can see it from here. We'll put the zoom

to them.

SC You can walk right up the landing site just like we did when we were down there. You can see Secchi; you can see the Apollo Ridge; you can see all those little ridges reflected very well in sunlight. You can't quite see our Sidewinder or Diamondback Ridge at this time, however.

CAPCOM Okay, we understand. Yes, that little crater that you're bringing into focus, bringing in the zoom now, with the rays, that's a real interesting little feature in it.

SC Yes, would you ask Jack Schmitt, please ask him what the name of that crater is just for identification? I think we may have seen that before, over. And it's Censorinus A.

CAPCOM I think, I think you got, got you on Jack Schmitt. He's grimacing and his head is furrowing now, but we'll have a name for you in a minute.

SC Okay.

SC Jack, since we didn't get any pictures of Censorinus we thought we'd zoom in on it from here.

CAPCOM Roger. Jack says the name of that one is temporarily Tom's Crater.

SC That sounds good. Okay, and right ahead from the bright crater as you walk on across there you can see Moltke. There's Moltke, and right up in there, if anybody from Oklahoma's listening, that's what we've termed the Oklahoma Hills. It's on the right, over.

CAPCOM Roger, we got those, Tom.

SC Jack, this camera's got such good resolution I think I can even zoom on Moltke from here.

CAPCOM Okay, we'll stand by.

SC Can you see the bright crater in the center of the screen there?

CAPCOM Roger, we got it.

SC That is Moltke. The landing site 1 is right to your left there, at least it's in my monitor. So here we can see landing site 1. In fact, we can even see crater 130 in this too. And all the white area which would probably be the tan area. It's white in my black and white - it's white in my black and white tube, but it's brown and tan out there as you look there. That's what we call the Oklahoma Hills, over.

CAPCOM Roger, Tom, we've got it. It looks great. That's too bad that y'all don't have color TV up there. This is a great view.

SC Yes, okay, I brought the zoom back

again. That maria material is really looking a deeper brown now.

CAPCOM Rog, okay.

SC Hey, Joe, we're starting to see the terminator come in I believe. We're starting to see the terminator come in on the far side which is really getting to be interesting. And we might say we're real thankful for it too.

CAPCOM Roger, understand.

SC We're going to show you a picture of the far side of the terminator in just a few minutes. One thing I'd like to point out if I could back on Messier. Those two sprayed craters, and I've made some drawings of them to bring back as to what it does - leave it here, I'm going to zoom on them.

CAPCOM Okay.

SC Well, we've got a lot of pictures to bring back and I'm sure they'll be very interesting to you, but I'm afraid they're going to ask as many questions as they answer.

SC Okay, if you look in the center of your screen you see two vertical craters. You got them? And you have the sprayed rays that come out down this way and you see those? Over.

CAPCOM Roger, we got it, Tom.

SC Okay, that's the Messier Craters and from here again you can see the maria material. It is a brown and the inside of the crater is a light tan and the rays that are sprayed out of them. As you can see there are just two rays pronged out of it. Out over the highland area it goes up to Censorinus, and those are tan rays that come out over the darker material. Now we're getting to see some of the back side, some rilles, some of the rugged side. We'll go down in this area.

CAPCOM Roger.

SC Okay, I guess it can be, if you're upside down, it could be front side or back side.

CAPCOM Okay.

SC The shadows are really lengthening and - the shadows are really lengthening in the terminator area and you can definitely see the terminator approaching.

CAPCOM Rog, we can see it on our screen here, Geno.

SC I think what it is, we're approaching it.

CAPCOM Good call, John.

SC One thing that we were real happy to see around - Roger, one thing that we're all happy to see around the moon was some mighttime because from te time we made TLI until we arrived at the moon, it was strictly out there in datime all the time. It's really a pleasant change to get back for a little nighttime. Over.

CAPCOM Right, understand.

SC Joe, it's still incredible. It almost tends to look unreal. This moon is set against a blackest black, incredibly black, that you can ever imagine.

CAPCOM Roger, understand.

SC The black has about the texture that you see often times that comes out of an oil smoke fire. It's really a - it's a jet black.

CAPCOM Roger, copy. And you're about 2000 miles out now, 10.

SC Roger, understand 2000 miles out.

SC I never thought anything could be as enjoyable as this even with the fuel cell light on.

CAPCOM Rog.

SC Okay, again, here's a real good size crater with patterns. I'll zoom in on it.

CAPCOM Roger.

CAPCOM Roger, we can pick it up now and we're picking up the rays, Tom.

SC Okay, as you look at that crater, again, the bottom floor of it is tan. You can see some clumping on the walls; the sides are chalky white; the rays going out are light tan; the area surrounding it is a darker tan, and then you move over to the maria area which is a darker brown than up here. But the crater is really a beautiful crater. It stands out with all those rays on it.

END OF TAPE

SC Okay, would you look at that crater? Again, the bottom floor of it is tan. You can see some sloping on the walls, the sides are chalky white, the rays going out are light tan, the area surrounding it is a darker tan and then you move over the maria area, which is a darker brown than up here. But the crater is really a beautiful crater. It stands out with all those rays on it. Down below, you can see the remains of an old crater still in the mare material, try to put it right in the center of your screen and it is right at the edge where the mare starts. Can you see it, over.

CAPCOM Got it. And it looks like there's another one on over to the left and down a little bit, another with some mare in the middle. It may be shadows.

SC Sure is. Right there.

CAPCOM (garble)

SC Say again, over.

CAPCOM What color did you say that was?

SC Guidance officer? Roger, if that was Phil Chambers just tell him that he's got a bottle of champagne due him for that, over.

CAPCOM That was Deke. He was wondering - verify the color of that mare.

SC Okay, I know what he's talking about but I'll - we'll talk about that later.

SC He's got one coming for not passing up any pads while we were gone from John.

SC Hey, I bet we fooled old Snoopy.

CAPCOM Rog.

SC Okay, Houston, I've got an interesting sight like we've never seen. Houston, take a look at this. We've never seen this before. The varied colors. You see the maria areas on the left.

CAPCOM Roger.

SC Well, the one on - they're different shades. The one right in the center is a darker brown than the one over the the west. You can see where they've flowed together there. It is a lighter brown, heading to a tan. I'll put the zoom on and hope you can get it. Here it is. We've never seen this before ourselves.

CAPCOM Okay, it's showing up pretty good right now, the way you're describing it. It looks great.

SC Looks like a couple of different flows there.

SC Right in the center of your screen you should see the discontinuity between the two maria areas. The one on the right is a darker brown, nearly a chocolate brown, and the one on the left is a tan, over.

CAPCOM Roger. That's just how they're coming in down here, Tom.

SC Roger, great. Hey, if you look over in the distance, you can see the night time coming on the moon up near the terminator and you do get some outstanding features there.

CAPCOM Roger, we've got that.

SC That's the first time we've been able to look at this distance and see a real discernible difference in the maria material. But this is really kind of a classic. I think the - you can see the flows. And also if you take a look - I'll try to zoom some more maria on the left, you can see some of the darker material near the upper edge of that where it's flowing in there.

CAPCOM Roger.

SC Okay, that's the picture we have now. You can see we probably are moving away close to 3000 miles now. It's still a beautiful view. In fact, just looking at it, you recollect you've come a long ways, so just imagine where we're going to go in a few years, over.

CAPCOM Roger that, Tom.

SC Again, I just want to check the resolution of this camera and zoom in on Censorinus, the landing site where Apollo 11 will land, and I'll go back and zoom in on that again, over.

CAPCOM Roger.

SC Okay, there is Censorinus. Over here is the crater Molke, above Maskelyne, Maskelyne B. We come down here to Little Bright crater there. It's right near the dip of the Oklahoma foothills here. It's called Okie, and to the left right in this area, is the landing site where Apollo 11 should land, over.

CAPCOM Okay, we got them all, Tom. They are coming through real good.

SC Boy, right now it's like watching it through a telescope. It's fantastic.

SC Right in the center of your screen is the landing site. Again you can see the hills on the other side down in this area. But the approach is very well marked by Censorinus there on one side and the lead in there from the two Maskelyne craters, over.

CAPCOM Roger. We're getting real good resolution down here, Tom.

SC Okay.

SC I guess we've been up nearly 24 hours, but it feels so great, I don't think we will go to sleep for a few more hours, over.

CAPCOM Okay, understand, Tom.

SC Just looking at this is about the best ... you can ever ..., over.

CAPCOM Roger.

SC Tom's going to try and zoom in on Langrenus for you. It's a pretty interesting crater, it's in the sunlight at the moment.

SC Okay, what you have there is the crater Langrenus, again, that is somewhat on the path that leads up to the Apollo landing site number 2. It comes right down this way. There you have the - other craters, there is Messier, comes on down across - in fact, there is the crater Weatherford and Mount Marilyn, down to Censorinus and comes right on over into Moltke and the landing site.

CAPCOM Roger, very good tour.

SC Yes, John sort of explained it for us all a second ago. He said he can't believe what he is seeing, and we really can't. We just can't believe what we are seeing. I tell you, Joe, this satellite of ours, this moon of ours, had a rough beginning somewhere back there,over.

CAPCOM Roger, understand, Gene.

SC It's really a priviledge to - it's really a great priviledge to just sit here and as the spacecraft moves radially outward and look at it, to feel - just to share some of our views with you, over.

CAPCOM Copy that, thank you.

SC The important thing about that camera, Joe, is what you're seeing is happening and what you haven't seen ain't happened yet.

CAPCOM Roger.

SC All three of us are commenting again that for the scientific interest, about the difference in color on that one maria area I pointed out to you there. And it's really becoming pronounced now. The basic maria area, I'm going to zoom in again, is like a chocolate brown, and from this sun angle, and over to the left is like a tannish brown. And again I'll zoom in and see how it looks to you, over.

SC Okay, there you are. I hope the colors come out the same to you, the same as we see them here. You can see the discontinuity there by those two craters, over.

CAPCOM Roger. It looks great, Tom, just like you're describing it.

SC Okay, thank you.

SC Okay, Houston, this is Apollo 10. All three of us are commenting again about this fantastic view out here and how it's just as well we approached this thing in brightside where you can't see it, because if we approached at this angle coming in, you would really have to shut your eyes, over.

CAPCOM Roger, understand.

SC Hey now, I wasn't skeptical when we came in, I just said I'd believe all that targeting when I saw 60 miles, and I'm a believer, and you've got one on me, but boy, I tell you if we were going forward now it would be a different story.

CAPCOM Roger.

SC Along that line, I want to congratulate you on that 5 degree window mark. It was perfect.

CAPCOM Okay, we copy.

END OF TAPE

CAPCOM Okay, we copied.

PAO Apollo 10 now 2700 miles from the moon.

SC Houston, Apollo 10. You know you've often heard of the nursery rhyme about the man in the moon. We didn't see one there, there were 3 men around the moon and pretty soon we hope that there are 3 men - pardon me, 2 men on the moon and 1 circling, but as far as seeing a man in the moon directly, we just didn't see it this time. Over.

CAPCOM Okay, Tom, thank you.

SC And we were looking, too.

CAPCOM Roger.

SC If there were any people down there they had a lot of rocks to play with.

SC It won't be long now until Snoopy's descent stage will be there with a big red white and blue American flag on it, though.

CAPCOM Roger that.

SC Houston, for just a quick break here we want to be able to show you that we're slowing down now as we leave the moon. You've seen a fantastic sight. We want to just take you inside the cockpit and say hello for a minute, and then when we come back out you should be able to see the - to really get a better view of the moon there with respect to having a whole sphere. Over.

CAPCOM Okay, mighty fine. We're standing by, Tom.

CAPCOM Okay, your picture is coming in real good, real clear.

SC Hello everybody.

SC While the view outside is fantastic, inside here we look like about 3 scroungy characters, but we really feel great, and it's been a fantastic trip. Over.

CAPCOM Roger, Tom.

CAPCOM You guys looking mighty good in there.

SC Roger, you getting any color on us in here?

CAPCOM Roger, the color is real good inside.

SC Well, we feel great, and we've felt great ever since liftoff and it's been a fantastic voyage. In just a minute we'll turn the camera around and show you John. Over.

CAPCOM Roger, who is winning the beard growing contest in there?

SC Well, I don't know. John's got the mustache won. I don't know about the beard.

SC I'm the baby of the group, Joe.

CAPCOM Okay.
SC Okay, we'll show you John.
SC John's got a little blue ink on his fingers.
SC I was writing a letter and I broke my pen. Does it show up in living color?
CAPCOM Open your hand up again.
CAPCOM Yes, it sure does.
SC How about that.
SC You can see we're pretty happy about this whole business.
CAPCOM Roger that. It sure looks good to see you again.
SC What are you doing?
CAPCOM We got your message on the blue dye, John.
SC Roger, you've got to watch when you write a lot with blue pens, and we're going to take you back outside and show you the moon as we see it. Over.
PAO And we have a view from 3000 miles.
SC Joe, the moon is starting to lose its spherical shape. It's becoming oblong now with the terminator with us going around into the area of the terminator.
CAPCOM Roger, we are showing that on our screens down here.
SC You know, lookinf at the earth terminator and the moon terminator is the only way we can figure out which is up and which is down, and sometimes they don't agree.
CAPCOM Roger.
SC For you people who aren't in the space flight business, I say it sure is fantastic and you really ought to try it.
CAPCOM Thank you, John, I hope to some day.
SC This is Apollo 10. It appears that the tube -
SC Roger, Joe.
SC Houston, it appears that the tube is starting to saturate when I go to full zoom and then it's gathering in too much light and it's coming back normal from the sun's rays. Are you getting that on your screen? Over.
CAPCOM No, we're still getting a real good picture down here, Tom.
SC Okay, I'll go back to the full zoom and just hold it there for a little bit.
SC Joe, I've always believed that nothing is impossible, and now I'm convinced of it and I hope that what we are doing here and what's going to go on in the future is going to be something that's going to be a betterment to all mankind. I'm convinced of that.

CAPCOM Roger that.

SC Houston, how does your picture look now and are you saturated at all? Over.

CAPCOM Roger, we're starting to get saturated now, Tom.

SC Okay, it appears that probably when I go to the wide angle enough to zoom it it starts to saturate a little bit, so I'll keep it down to lower at this time.

CAPCOM Roger -

END OF TAPE

SC Saturate a little bit so I'll keep it down to a lower at this time.
CAPCOM Roger, it's a whole lot better now.
SC And you notice - now you can really start to notice near the horizons how rugged it is, and do you see the little peaks sticking up on it?
CAPCOM Roger, we picked those out.
SC Okay, Houston, the moon, as we move away and our velocity slows down, the moon is starting to grow less in diameter relative - as far as our visual view, so what we'll do is terminate the TV now and we'll bring it back on in a little while when we get squared away here and show you a little bit better distant view. Over.
CAPCOM Okay, mighty fine, Tom.
SC Okay, and this is Apollo 10 signing off for awhile, and we'll be back in about 30 or 40 minutes and see how it looks then. Over.
CAPCOM Okay, 10, this is Houston. We'd like to dump the tape now and we'd like to keep the high gain antenna while we do that.
SC Yes sir. Will this attitude be okay, Joe?
CAPCOM Roger, that will be fine.
PAO At the conclusion of the television transmission Apollo 10 was about 3390 nautical miles from the moon. The transearth injection maneuver, which started the spacecraft back to earth, as you heard early in the television transmission, was very close to nominal. The maneuver is target to bring Apollo 10 back to earth at a ground elapsed time of 192 hours 4 minutes, or just 4 minutes- 8 days and 4 minutes after liftoff from Cape Kennedy. At the present time the spacecraft is traveling at a speed of 6046 feet per second, and we show 3436 nautical miles from the moon.
CAPCOM There is no restraint on the thermal world.
SC Okay, real fine. Thank you, Joe. Over.
CAPCOM Okay, 10, this is Houston. You can have the computer back now. And your REFSMMAT is in.
SC We've had the computer for quite a while.
CAPCOM Okay, I'm sorry.
SC I hope. Cause we've been playing with it.
CAPCOM You're right.
SC Hello Houston, this is 10.
CAPCOM Go ahead 10.
SC This is - we're circling 26 to 26 and a half volts up here pretty regularly at the moment.

CAPCOM Roger, we copy.

SC We're going to see if we can bring it up a little bit. We're going to see if we can bring it up a little bit. We've got the dac power power off - the dc power rather and a couple of other things, and we'll watch it, but I just wanted to let you know we're looking at a low 26 and a half.

CAPCOM Roger, we copy, we'll look at it.

SC And I guess we're up to about 27 now, so we're probably in pretty good shape.

CAPCOM Okay, I'm going to turn you over to the Marines now. I'll see you a little later.

SC Roger, Joe, thanks a lot for all the help there on the CAPCOM and (garbled) real great. We'll see you back in Houston probably next Tuesday. Over.

CAPCOM Roger that, you're right in the groove.

SC Thank you, Joseph.

END OF TAPE

SC Houston, Charlie Brown. Do you want me to put my high bit rate into low?
CAPCOM Stand by one.
CAPCOM Affirmative, Apollo 10. Put your high bit rate to low.
SC Okay.
CAPCOM Apollo 10, Houston. We're going to keep the configuration we've got until we get P52 finished and the dump finished, over.
SC Roger.
SC Houston, on these P52's REFSMMAT realigns, can you give us attitudes to go to so we can avoid the gimbal lock alarm?
CAPCOM Roger, I think we can do that. Stand by.
SC Hello, Houston, I've got some on board readouts for you.
CAPCOM Roger, go ahead, 10.
SC Okay, batt C is 37, pyro A is 37, pyro B is 37.
CAPCOM Roger, understand batt B -
SC - is 55, -
CAPCOM apollo 10, -
SC RCS is 55 - okay, I'm ready now. RCS A is 55, B is 71, C 66, D is 63 percent. Over.
CAPCOM Roger, Apollo 10. We copy, 37 37 37, 55 71 66 63, and you can do your P52 in the present attitude and go right from there to PTC, over.
SC Okay, P52 in present attitude and from there to PTC.
SC And it says on page 94 of our flight plan we can tell we're returning because we're facing the other way. A phrase by that one famous dog.
SC Houston, our condenser exhaust temperature is cycling one again between the limits and I think it just triggered a quick master alarm on fuel cell 2 but it's cycling like it - just like it was in lunar orbit.
CAPCOM Roger, 10, we copy.
PAO This is Apollo Control. We're estimating about 15 minutes for the change of shift press briefing as the Maroon team of Flight Controllers goes off shift. Participants will be - stand by.
SC Okay to realign the PTC right now?
CAPCOM Stand by one.
CAPCOM Apollo 10, Houston. Go ahead with your PTC alignment.
SC Roger.
PAO This is Apollo Control. To pick up again on the press conference, participants will be

Maroon team Flight Director Milton Windler, Spacecraft Communicator Joe Engle, Astronaut geologist Jack Schmitt. They are estimating about 15 minutes arrival at the main auditorium here at the Manned Spacecraft Center. We rejoin the air to ground communications between Apollo 10 and Mission Control.

CAPCOM — Apollo 10, Houston, we would like you to turn on your fuel cell 2 H2 purge line heater, over.

SC — Yes, I've had the H2 purge heater on about 5 minutes now, Jack.

CAPCOM — Roger, Gene.

SC — And our plan is to leave H2 in an open purge until 140, is that correct - 13930?

CAPCOM — Stand by.

CAPCOM — That is affirmative, Gene, 13930, purge fuel cells.

SC — Okay, thank you, Jack. I assume not fuel cell 1, is that correct? Just 2 and 3?

CAPCOM — Gene, just purge 2 and 3, not 1, over.

SC — Thank you, Jack.

END OF TAPE

SC Houston, Apollo 10, confirm that there is an option 1 realign.
CAPCOM Houston, Apollo 10, say again.
SC Roger, confirm that this is an option 1 platform realign.
CAPCOM Stand by one,
SC I'm sure it is, I just wanted you to make sure.
CAPCOM Okay, John, that's an option 1 confirmed.
SC Roger.
SC Hello, Jack, I've got some rad radings.
CAPCOM Go ahead with the rad.
SC Commander is 26042, Champ is 05311, and I'm 15043.
CAPCOM Roger, copy 26042, 05311, 15043, thank you.
SC And negative on the pills today.
CAPCOM Roger, copy.
SC And the gans have been cycled.
CAPCOM Roger.
CAPCOM Apollo 10, HOuston.
SC Houston, we're going through a regulator check at this time.
CAPCOM Roger, we copy.
SC Go ahead.
CAPCOM We'd like to know, did you turn the GDC off by going to ECA? Over?
SC Roger, we turned it off and then turned it back on here since we're going to do this IMU realign. Over.
CAPCOM Roger, understand off and then on. Thank you.
SC Just want to check agin how much it increased our voltage and after we get the IMU completely torqued around then I'm going to turn the GDC CA bar to ECA. Over.
CAPCOM Okay, Tom.
SC Houston, this is 10. When I start up the secondary glycol pump I get Main Bus A under volt. It's probably atransient, but I turned it off at this time.
CAPCOM Roger, we copy.
SC I'm sure it's a start up transient, but I haven't tried it again, so recommend we just delete it. It did starr up and the secondary evaporator has been working well. Do you - ah - shall we delete that test or shall we give it a try?
CAPCOM Stand by one and we'll check.
CAPCOM Apollo 10, Houston, delete the secondary loop check. Over.

SC Very good, thank you, Jack.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, CDT 0701, GET 13912 477/1

PAO This is Apollo Control. Something in the nature of a gee-whiz number, at the time of the trans-earth injection burn, Apollo 10 was some 211,373 miles away from earth on the back side of the moon. Change of shift briefing is scheduled to begin momentarily in the main auditorium. Air to ground Apollo 10 transmissions will be picked up at the conclusion of the press conference. At 139 hours 13 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

CC Apollo 10, Houston. On your next fuel cell purge, fuel cell 3 should be nominally second purge but we'd like you to try something different on fuel cell 2; hydrogen purge. We'd like you to try 5 cycles and the purge is 15 seconds each. And 2 to 3 seconds between cycles, so purge for 15, off for 2 to 3 seconds, and then back on 5 times. Over.

SC Okay, Jack; I'll start right now with hydrogen 2, H2 purge, okay?

CC Roger; we'll be watching. Apollo 10, Houston, if you want to AUTO maneuver the PTC, we can give you some angles.

SC (static)

CC Apollo 10, Houston; we are not copying you.

SC Roger, Houston, go ahead with the angles over.

CC Okay, roll 105 pitch 90, yaw 0.

SC Roger. Roll 105, pitch 90, yaw 0.

CC That's affirm.

SC Roger, thank you.

SC Okay, Houston. And before - what time do you want us to maneuver that, over.

CC You can maneuver any time Tom.

SC Okay, before we go there, we're gonna give you one last picture of the moon now, see the terminator coming - we'll just give you a short look at it; if they are still configured for TV; over.

CC Stand by 1. Okay, Tom, we're configured; send it down.

SC Houston, you should have the tube coming down now. Reading the picture now, over.

CC We're checking the network sound on it -

SC Houston, do you have a picture?

CC We don't have it in the MOCR yet, but we are checking the network. Stand by.

CC Okay, we got it now - looks good.

SC (static) When you see the terminator coming on there, it looks like the moon is lopsided. John is holding the camera pane and Gene is opening focus on it. And its a beautiful view there; over.

CC Yeah, really looks good from here Tom.

SC Okay, how's your color look on it now - over.

CC In the MOCR here we're seeing a green and white -

END OF TAPE

SC Hello, Houston, I've got some onboard readouts for you.
CAPCOM Okay, we got it now. Looks good.
SC Roger, we can see (garble). When you see the terminator coming on there it looks like the moon is lopsided. John is holding the camera pane and Gene is operating focus on it, and it's a beautiful view there, over.
CAPCOM Yes, it really looks good from here, Tom.
SC Okay, how's your color look on it now? Over.
CAPCOM In the MOCR here we're seeing a green and white moon.
SC Well, green and white?
CAPCOM Yes, it's green up near the terminator and white up near the - near the other limb.
SC You must be talking about the cheesy, part of it, huh?
CAPCOM Yes, I guess you guys must have done that to it.
SC Yes, you might say something like that. Okay, again, just for correlation on the colors that we have, about the best area of that mare that I can describe, it looks like a chocolate milkshake. That's about the best color brown that I can describe. Over.
CAPCOM Roger, Tom, we copy. Move that camera a little bit to the right.
SC We'll get it in with our monitors. Stand by one.
CAPCOM Okay, 10, that's real good.
SC How's it look from up here, Jack?
CAPCOM That's real good now, Gene.
SC Houston, 10, how does your color look? Over.
CAPCOM Stand by one, Tom. I don't know whether you've got true color in here.
SC Okay.
CAPCOM Our color is looking real good now, Tom.
SC Okay.
SC We're looking at the window - the moon now. We backed off so you can see the shade or the shadow of the hatch window so you've got an idea which side it might be if you can see any of the window frame at all. John's backed off to the point where the moon is now through the hatch window.

CAPCOM Roger, I can just make out the edge of the hatch window.

SC Rog. It gives you an idea of relative size as to what we're seeing compared to the window itself. Okay, Houston. We just want to give you one last show to show how it's starting - the lighted part is starting to look all brown as we move out and see the terminators and start to - continue to move out further and slow down. And it's been real great being able to show you this so you can share the same view that we have, over.

CAPCOM Roger, Tom, and it looks real good and I know the folks here at home are really enjoying the show. I bet you feel like you're really moving out.

SC Yes, that initial climb out was just fantastic, Jack, and I was telling Joe earlier that it's a good thing we approached the moon from the other way because if we approached it from this way straight going like that you'd have to shut your eyes, over.

CAPCOM And, Tom -

SC It's going to be real interesting for us to look at - oh, pardon, I was just going to say it's going to be real interesting for us to look at the TV films after we get back, over.

CAPCOM Yes, Tom, I know you'll enjoy that. The TV experts wanted me to tell you that your adjustment of the color camera for both exterior and interior is just perfect, over.

SC Okay, real fine, thank you.

SC Okay, Houston, this is Apollo 10. We've been up about 21 hours, nearly 22 hours, and we think we'll go ahead and start setting up for the sleep cycle and just go ahead and start with the PTC attitude, and at this time we'll go ahead and turn the TV off and this is Apollo 10 signing off for the TV.

CAPCOM Roger, Tom, thanks a lot for the TV show. It's a little early around here -

END OF TAPE

PAO This is Apollo Control 139 hours 53 minutes ground elapsed time. Apollo 10 is now 7160 nautical miles outbound from the moon, travelling at a velocity of 5,524 feet per second. During the last 15 or 20 minutes there has been an accumulation of about 6 minutes of air to ground transmissions during the time the change of shift briefing was underway. We're prepared now to roll that tape and listen to it and we will rejoin the conversation live as it continues. The crew is now powering down for the sleep period. Let's listen to the tape that has accumulated.

SC Houston, on this PTC, do you want to establish 20-degree deadband, 1/10th of a degree per second, or you want to try this other thing?

CAPCOM John, this is Houston. We want the 30-degree deadband with a 3/10ths degree per second, over. - correction 3/10ths degree per second.

SC Okay, it's set up just the way you did coming here, right?

CAPCOM That's affirmative, John, and when you get down to disabling jets, we want you to disable all jets in quads C and D and we're standing here looking at the procedure, if you want us to help you on it.

SC Roger, understand, charlie and dog.

CAPCOM That's affirmative.

SC Okay.

SC Hello, Houston, Apollo 10, over.

CAPCOM Go ahead, 10.

SC Okay, Jack, looking ahead in the flight plan, what we would like to do is make this a pretty long sleep period. I understand the first midcourse occurs in 15 hours and was initially looked at at about 1 foot per second, which shows we are right in the slot. What we would like to do is sleep a little bit longer than what was outlined here, since we've been up for about 22 hours, over.

CAPCOM Okay, let's get these people to arrange it. Stand by, please.

SC Okay.

CAPCOM Tom, looks like we're planned to let you sleep in already and the only thing that would possibly change that flight plan-wise is some P23 activity, which we can postpone, over.

SC Okay. We're all of us kind of bushed out now, just a little bit tired from doing all that today, and John particularly. He's really worked hard on his landmark tracking and his eyeballs are sore, so if we can postpone that for a little while and sleep in, we would sure appreciate it, over.

CAPCOM Sure, we will work that out and we want to ask you if you've been getting any caution and warning on fuel cell 2 recently.

SC No, the cycle light is still there but it hasn't cycled into the caution and warning region.

CAPCOM Roger. It turns out that the purge fuel cell 2 didn't change anything and we're trying to work something out, so this won't be bothering during the time you are trying to sleep, over.

SC Okay, apparently the package or the pump, or whatever is cycling doesn't bother you down there, huh?

CAPCOM Well, exhaust sensors are getting down near the caution and warning limits. It hasn't gone over them yet, but we thought if they started doing it, why it was going to bother you and we're trying to figure something else.

SC Yeah, I know. But my question is, your analysis of what's causing the the cycle, may be the pump is going on and off, or there's a temperature sensor that's out of balance or something. Whatever you think it might be, it isn't bothering you, huh?

CAPCOM Gene, we're just taking a look at fuel cell 2 and we're analyzing what it's doing but at the moment, it is of no excessive concern, over.

SC Okay, thank you.

CAPCOM Apollo 10, Houston. We have a pre-sleep checklist for you. A few items to turn off when you are ready to copy, over.

SC Okay, Jack, go ahead.

CAPCOM Okay, your optics power switch off, your SPS electronics to ECA, and using omni for PTC, go to omni and bravo. Your high gain antenna track manual, potable water heater off, high gain antenna power off, your rotational controller power direct both off, and on your cryo tanks, we want all cryo fans off and on the heaters, reading on your switches from left to right, your H2 tank 1 heater off, your H2 tank 2 heater auto, your 02 tank 1 heater auto, and your H2 tank - correction your 02 tank 2 heater off, over.

SC Okay, on the heaters I got 1 H2 is off, 2 H2 is auto, 1 02 is auto, 202 is off and all my fans are off.

CAPCOM That's right. You got it right.

SC And let's see. You gave me the rote power, potable water heater, high gain to manual with power off with omni B SPS electronics ECA and optics power off.

CAPCOM Rog, you got them all.

SC Going omni at this time.

CAPCOM Roger.
CAPCOM Apollo 10, Houston. We'd like to have you confirm that you're now in the 20-minute wait period with jets on quad charlie and dog disabled, over.
SC Houston, we're getting there. WE're not there yet.
CAPCOM Okay, Gene, just tyring to help you out a little bit, knowing you guys are tired.
SC Yes, I know it, we're getting there.
SC Okay, Houston, we're starting a 20-minute wait.
CAPCOM Okay, John.

END OF TAPE

SC That's ... away.

CC Okay, John. Apollo 10, Houston. We see your state vectors are good; it doesn't need any updating, so delete that; like you to insure that your H2 purge line heaters are OFF, and we noted that your dap is in AUTO and it should be in FREE for the 20-minute wair period. Over.

CC Correction; it is in FREE, and should be in AUTO for the 20 minutes wait period. Over.

SC I got that Jack. And ... heaters are off.

CC Apollo 10, Houston. We are going to hand over to Madrid here momentarily, and there might be a little noise on account of that.

SC Okay - would you believe that now we are starting the 20 minute wait period.

CC Roger - I know - we're getting there.

SC Only problem is that I may fall asleep before the sleep period.

PAO This is Apollo Control. That concludes the play back of the accumulation of tape from the Apollo 10 transmissions; the crew is settling in for sleep and any further conversation before they finally do drop off to sleep will be played back inasmuch as it is impractable to try to stay up live, not really knowing when they will start talking - and at 140 hours, 4 mintues ground elapsed time, this is Apollo Ctonrol.

END OF TAPE

PAO This is Apollo Control 141 hours 1 minutes ground elapsed time. The crew of Apollo 10 is apparently settled in for a long, well-deserved rest period after being up for approximately 22 hours. Had a very successful transearth injection burn, powered down the spacecraft and are now in the passive thermal control mode, so-called barbeque mode, stabilizing the spacecraft temperatures. They are now some 10,729 nautical miles outbound from the moon, coming back toward this speck of cosmic dust we call the earth at some 5,328 feet per second. And the situation is rather quiet here at the Control Room, looking at playback data from the transearth injection burn. And 141 hours 2 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 142 hours 1 minute ground elapsed time. Apollo 10 crew is apparently asleep at this time. We've had no communications from them within the last hour or so. Some numbers on distance, reference distance is now 198,243 nautical miles, velocity 4,780 feet per second. Flight Surgeon just reported to the Flight Director that Commander Tom Stafford is apparently in a rather deep sleep according to the biomedical readout. Some other numbers now on the current predicted entry interface 191 hours 48 minutes ground elapsed time with splashdown about 14 minutes later at 192 hours 2 minutes, just 2 minutes over 8 days even. This would be 11:51 Central daylight time. These numbers likely will change as additional tracking is brought in and processed through the computers here in Mission Control Center. Major events today will be - include another television transmission at 152 hours 35 minutes ground elapsed time. The accuracy of the transearth injection burn was such that the first midcourse correction - midcourse correction burn number 5 at TEI + 15 hours is estimated to be only 2.6 feet per second. Here again, this may be allowed to accumulate to add to a later midcourse correction scheduled time. At 142 hours 3 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 10 COMMENTARY, 5/24/69, CDT: 1050, 143:01 GET 483/1

PAO This is Apollo Control, 143 hours, 1 minute ground elapsed time. Apollo 10 crew sleeping soundly at this time. Spacecraft now being tracked at 195 441 nautical miles from earth, and coming back at a velocity of 4 768 feet per second which will continue to decrease until the spacecraft reaches the so-called moon sphere of influence or actually back into the earth's sphere of influence at which time they will begin to accelerate again. No other new information to report at this time; the wake up time will probably be around 1:30 this afternoon, Central Daylight Time, we're showing now an entry countdown clock of 48 hours, 46 minutes, 43 seconds, however this time does not show any midcourse correction maneuvers, if any midcourse corrections are made, this time will be changed somewhat, and at 143 hours, 2 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, CDT 1150, GET 14401 484/1

PAO This is Apollo Control 144 hours 1 minute ground elapsed time. Apollo 10 crew is still asleep at this time with some 4 hours remaining of their sleep period. The spacecraft is now 192,621 nautical miles from earth, travelling at a velocity of 4771 feet per second. Here in Mission Control is sudden increase in the odor of delicatessan food, pastrami, bagel, and so on. Assistant Flight Director Ed Fendell just brought in a great amount of food for Flight Controllers to have a mid-day snack. All quiet otherwise at Mission Control, People mainly studying the data from the transearth injection burn. Still tracking through the Madrid station. A line projected from the center of the earth out through the surface to the spacecraft puts the spacecraft approximately over Central Africa. And 144 hours 2 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, GET 145:05, CDT 1254 485/1

PAO This is Apollo Control 145 hours 5 minutes ground elapsed time. Apollo 10 is still asleep at this time, some 2 hours 50 remaining in the crew sleep period, which has been extended about 2 hours longer than the nominal flight plan time. Distance now from earth 189 604 miles, velocity 4784 feet per second, and at 145 hours 6 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY,5/24/69, CDT 1322, GET 14512 485A/1

CAPCOM Hello, Apollo 10, Houston standing by. We were going to let you sleep in a couple of more hours but we're ready to go if you are.

SC Roger, Jack. Just woke and we feel great. Starting to take down a few of the window shades. Again, this REFSMMAT is really a beautiful attitude because we can see the moon out one window and the earth out the other window and it looks like things have gone real good. I'm getting real excited just -

END OF TAPE

PAO This is Apollo Control; lets join the conversation in progress.
SC (static) over.
CC No, we haven't fired a thruster and the attitude is looking real good and we have a little traveling music if you'd like to listen.
SC Go ahead; over.
CC Okay, stand by.
(ITS SO NICE TO GO TRAVELING sung by Frank Sinatra)
CC Okay, 10, Houston. How did the traveling music come through?
SC That was really great. You people have come up with some (laughter) real great (laughter) numbers there for us; we sure appreciate it; over.
CC Well thank you Tom. Since the other day you made a special request for the Marine Corps Hymn why everybody around here has been trying to get us to play that, but I can't allow them to do that, since you'd have to stand up, and you guys have said you don't know which way is up, so we can't play that one.
SC (laughter) Okay, understand. Over. Hey, Jack, how come it takes us so much longer to train you to be a capcomm than Charlie and Bruce and Joe?
SC What Gene's trying to say is that good Marine Corps training must have come through there; over.
CC I hear you; keep talking.
SC Just kidding there; over.
CC Well, you may notice that your exhaust temperature in fuel cell 2 is stabilized out and sure enough has been that way for the last few hours, so it looks like that's no sweat; your trajectory by the way is right on. You're laying right in the middle of the fairway there - going to take us about 15 hours to predict the uncertainties in your trajectory as a matter of fact, so we're going to skip midcourse 5, and we have a choice of either making midcourse 6 or 7 - and we're going to make midcourse 6 I believe and it'll only be 1 and a half feet per second. Over.
SC Roger. That just sounds beautiful; looks like that burn back of the moon - the guidance and trajectory and everything put us right in the - right down the alley of the fairway; over.
CC I know - you're going to pass through the lunar sphere of influence at 148:39 and during the time you were sleeping, you got to the point where you stopped decelerating and you are now accelerating and you're 187 300 miles out and you're about 4800 feet per second.
SC Roger; 4800 feet per second. We got a beautiful view out here of both the earth and the moon in our hatches and say, every half a rev, we can see both of them for quite awhile and when you get high gain lock

through Goldstone, we'll show them to you for just a couple of minutes; over.

CC Sure would like to take a look at that; let's see if we can crank that up.

SC Roger; I don't know if Goldstone has contact yet - I'll leave that up to you; over.

SC Hey Jack, I just put battery A charge on; started about 2 minutes ago.

CC Okay, that was one of the items in the flight plan update, and I understand you've got batt A charge on the line. Got a little bit of advance weather in the landing area; the forecast for your landing time is 1800 scattered, 10 000 broken, high broken, winds 120 at 15; seas will be 5 feet, and there are scattered showers in that area which means less than 10 percent of the area has showers; right now there is a stationary front sitting over in that area, but its quite weak, and the recovery forces this morning conducted a simulation in the area.

CC And 10, we've got some morning news here if you want to listen to it some time.

END OF TAPE

SC Hello Houston, Apollo 10, Over.

CAPCOM Apollo 10, Houston, how do you read me now?

SC Roger, Jack, reading you loud and clear. I guess we switched antennas and we lost comm just about the time you said 1800 scattered. Over.

CAPCOM Oh, all right, we'll go through that again. Your forecast weather for the landing area is 1800 scattered 10 000 broken and high broken. The winds will be 120 at 15, 5 foot seas, and there are scattered showers in the area, which means, however, that - less than 10 percent of the area's got showers and the recovery people were conducting a simulation in your landing area this morning. There is a stationary front in the landing area. However, it is relatively weak as you can tell from the weather. And we'll continue updating you on the weather periodically. We also have some morning news here if you want to listen to it.

SC Roger, go ahead.

CAPCOM Okay, Apollo 10 Morning Newscast from Manned Spacecraft Center, Public Affairs Office: Everybody is really raving about your latest television pictures. They say, "The television pictures of the moon beamed to earth from Apollo 10 shortly after TEI are being described as the most spectacular of the mission. Because of the early morning schedule for much of the U.S. the transmission is being replayed at various hours throughout the day. However, the consensus of opinion here is the same as yours, utterly fantastic." Aside from the Apollo 10 news, here is a summary of other news and news highlights and a look at sports: President Nixon took time off from his busy schedule to enjoy a band concert on the White House lawn yesterday with the Soviet Ambassador Dobrynin. Mucic was provided by the University of Minnesota Concent Band that had just returned from a concert tour of the Soviet Union. Dobrynin was so pleased with the concert that he suggested that the tuba player be named Secretary of State. Both Dobrynin and President Nixon were observed tapping their toes and clapping hands as the band played "Minnesota, Hats Off To Thee". Another historic voyage was scheduled to begin today from the coast of Morocco. Norwegian adventurer Thor Heyerdahl was scheduled to leave the North African coast for an ocean voyage to the Caribbean Islands. Remember he's the guy who had the crewman aboard who had 3 wives, the last one costing the outragous sum of $60. Anyway, Heyerdahl and his crew of six are sailing in an exact copy of an ancient Egyptian sailing vessel. The boat is made of Papyrus reeds. The U.S. Senate is expected to give quick confirmation of Judge Warren Burger as the new Chief Justice of the Supreme Court. Chief Justice-Designate Burger is reported to be a "Law and Order" type judge.

CAPCOM The City of Houston is without a Symphony Orchestra. Musicians rejected a three-year contract proposal yesterday. Andre Prein also conducted his last concert with the orchestra. Former Governor John Connally told graduating students of the University of Saint Thomas that despite the problems within the United States our country is the "greatest organized society this world has ever known." Connally received an honorary doctorate at the school's commencement exercises. Here's a look at sports. The Astros shut out the New York Mets last night by a score of 7 to 0. A crowd of 11,000 saw Tom Griffin pitch a five-hit shutout striking out 13 batters. The Cubs' Ken Holtzman shut out San Diego 6 to 0, and it was Philadelphia 6, Atlanta 2. The Cubs now lead their division by 5 games while Houston is 9 games out of first place in the Western Division of the National League. One of these days Oklahoma will have a baseball team. The weather is good for time trials at the Indianapolis Speedway today. A. J. Foyt and Roger McCluskey are expected to battle it out for the pole position. In previous runs around the track, Foyt has done over 172-miles-per-hour and McCluskey over 170-miles-per-hour. Mario Andretti smashed into a wall yesterday and totaled his Lotus-Ford, but was not seriously injured. He came back to drive a test lap in his back-up car at a speed of 169 miles per hour. Foyt will try to win an unprecedented fourth "Indie 500" race. Augie Erfurth is reported to have resigned his post as Assistant Athletic Director at Rice University. Athletic Director Bo Hagan is expected to make the announcement today and appoint a successor to Erfurth. Pete Brown shot a 66 to take the halfway lead in the Atlanta Classic Golf Tournament. After 36 holes Brown has a card of 135. The big name golfers are all down in the pack, 3 to 6 strokes off the pace. Boxer George Forman has signed up a manager and will make his professional boxing debut at Madison Square Garden in June. The 1968 Olympic champ is, according to his new manager, Houston's first heavyweight champion of the world. The Dallas Cowboys yesterday announced that reserve quarterback Jerry Rhome has been traded to the Cleveland Browns. In return, the Browns will get an undisclosed 1969 draft choice. The Cowboys will still have Don Meredith and Craig Morton, in addition to Roger Staubach, the former Navy great, who joins the team this fall. And a final note, preparations are being made for a hero's welcome for the Apollo 10 crew at Pago Pago. Governor Owen Aspinall says he will personally supervise the welcoming. Over.

SC Roger, Houston, that's quite a bit of news, and tell the governor of Pago Pago we appreciate it, but he doesn't have to go to any special effort. Over.

CAPCOM Yes, well, I didn't read the last sentence here. It said, "Maybe there will be dancing girls there", but now you know, and by the way, the unemployed local philosopher now says that -

SC Oh, well, if he wants to go to yhe special effort -

CAPCOM Yes, I thought you might change your mind. By the way, the unemployed local philosopher now says that due to your efforts color television is now on its way back.

SC Roger. Give our best to the unemployed philosopher there; and that total situation down in Samoa sounds like - is that going to be a top hat or topless type of affair? Over.

CAPCOM Just come as you are, Tom.

SC Okay.

SC Hey Jack, have you got our astrocast today?

CAPCOM Stand by. We'll see if we can get them.

CAPCOM And Apollo 10, Houston, looks like your TV lines will be ready from Goldstone at 146:47, 40 more minutes.

SC Roger, 146:47.

SC Hey, Jack, when we get back if we have time I'd sure like to hear (garbled)

CAPCOM Sorry, you'll have to speak into the microphone. I didn't catch that.

END OF TAPE

CAPCOM Apollo 10, Houston. How do you read?

SC Roger, Houston. Reading you loud and clear, over.

CAPCOM Okay, I hear you the same. The afternoon television program has slipped to 147 hours, and if you want some TV attitudes and high gain angles for subsequent television programs, why, I've got them here.

SC Roger, Jack. Actually, this PTC attitude we're in now, just - we can pad it when we slowly rotate - we can, in a period of time, we can get both the earth and the moon in right in this attitude while we're still in PTC, but I don't know whether you can get high gain lock, over.

CAPCOM Okay, 10, Houston. Looks like you could probably give us TV in the PTC mode with your high gain at pitch plus 30 and yaw 270, over.

SC Roger, pitch plus 30 and yaw plus 270. Roger, in fact, why don't we go ahead and just - we'll make a try earlier and see if we can maintain high gain lock, over.

CAPCOM Roger.

SC And we'll do that later on. We're watching our voltages now. Houston, is Deke around there, over.

CAPCOM Negative, Tom. He was in here earlier and he'll be back.

SC Okay, there's one thing that we wanted to put down as a flight change in procedure after we land. All three of us are still itching rather badly from all the fiberglass that we had in here from that insulation. I've got a little bit of rash on my hands, so say after the normal ceremonies on the carrier, I'm saying the first thing we're going to do is take a shower and get rid of this fiberglass, over.

CAPCOM Roger, we copy.

END OF TAPE

SC Hello, Houston, this is 10.
CAPCOM Go ahead, 10.
SC Okay, looking back over my records, the last two readings I gave you for the CMP are wrong, on the rad readings. Wait a second, I'll be right back with you.
SC Jack, the up to date reading as of right now, if you want them, I'll give them to you.
CAPCOM Go ahead.
SC Commander is 26043, CMP is 05043, and the LMP is 15044. And the last two or three readings on the CMP, it's my fault, it may be I just copied them wrong, but the incremental increase that you've seen on my rad meter is typical of the increase in the other two, right along.
CAPCOM Roger, copy, thank you.
CAPCOM Apollo 10, Houston. We'd like you to verify a switch. Please verify glycol evap temp in switch in the auto position, over.
SC No, Jack, it's in manual. Glycol evap temp in is in manual.
CAPCOM Okay, Gene, let's put the glycol evap temp in in man - correction, in auto, over.
SC Okay, it's in auto. I'm not sure n it went to manual though.
CAPCOM Roger. Our data shows that it was probably in manual and you didn't verify it. It should be in auto unless you've got some reason otherwise, let us know.
SC No sir, Jack, it should have been in auto. I guess maybe I hit it accidently or something. I don't know.
CAPCOM Apollo 10, Houston. When you have window number 5 looking at the moon, then high gain antenna angles will be pitch -62, yaw 266, over.
SC Okay, when we've got window 5, it will be pitch -62 and yaw 266. Thank you, Jack.
CAPCOM And by the way, Gene, your astro-cast from your friendly communicator here says discussion fills much of the morning and you will learn a great deal that would never have come to your attention, that is, if you listen well.
SC That's right. I was going to have a briefing on the stars and planets today.
CAPCOM Yes, and by the way, John, yours is keep your attention focused on your affairs Saturday. The necessary chores are quite enough for the time being and leave all the frills for another time and place, over.

SC I promise.
SC Hey, Jack, you're wondering about me, babe, I can't come back with that one.
SC What have you got for the commander?
CAPCOM His isn't anything very exciting. Just says here problems tend to get out of hand and logic is not quite enough. There is nothing to do but ride it out with a certain amount of leniency. Sounds like the boss.
SC Hey, you guys are too much down there today, over.
CAPCOM Apollo 10, Houston. If you want to acquire on the high gain a little early, you can go through pitch + 30 and yaw 270 right now, over.
SC Pitch +30 and yaw 270. We'll wait a second, Jack. We're getting some job here.
SC Rog. Houston, I just want to give you an informal report on the star visibility in the PTC REFSMMAT.
CAPCOM Roger, go ahead.
SC With a prominent -

END OF TAPE

SC - wait a second Jack - we're getting some chow here.

SC Houston, I just want to give you an informal report on the star visibility up here in the PTC REFSMMAT.

CC Roger; go ahead.

SC With the sun, the moon, and the earth light shafting, even with that, we are able to - and we're pointed up to the north constallations and so we are looking out at about an angle of 35 degrees to the elicptic pointed up, we were able to recognize the Big Bear, the Big Lion and the First Jupiter, Arcturus, Alphecca, and even ole Rassalhague, and the navigators triange, and from then on, due to the sun, things sorta get washed out, and they get washed out right on around till you pick up the Big Dipper again. But I'll tell you - that's the first time translunar and transearth that I was ever able to recognize a contallation, and that is really encouraging.

CC Okay, you are able to recognize the Big Bear, Big Lion, Antares, Rassalhague and you are washed out toward the Big Dipper and your eyes are getting better; over.

SC Past Rassalhague, clean through the first part of the Great Square and then it blanks out due to sun shafting on the optics.

CC Roger.

SC If you got a star chart in front of you, somebody can show you what I'm talking about. But I mean to tell you - there's a place in there, just out 180 out from the sun, where its exactly like nightime; just great. Every star is visible.

CC Roger; we copy John.

SC And another thing about that thing Jack is the shafting that keeps you from recognizing the star patterns isn't all from the sun; the earth is of course pretty close by the sun, and when it comes out, it wipes out your night vis too.

CC Roger.

SC But the moon - just for a very limited region around it - ah, looks like about 30 degrees - is all it hurts - 15 to 30; too hard to get a correct handle on that number cause it fades in and fades out.

CC Roger - how bout around the earth; how much does it wash out?

SC Well, like I say, from - I was able to see Mars in the - actually the earth doesn't hurt you too bad, for example, I was able to see Altair.

CC Roger John.

CC And Apollo 10, Houston; I have a consumable update and flight plan update when you are ready.

SC Houston, this is 10, how do you read, over.

CC 10; reading you loud and clear.

SC Okay, Jack, go ahead with your consumables update.

CC Okay, consumables at 147 hours; RCS total 56 percent, 46, 63, 56, 59. That's 18 percent above the flight plan. H2 totals 24.5, 02 is 336; over.

SC I got it all Jack and go ahead with the flight plan updates.

CC Okay, flight plan update at 151 plus 30, delete all reference to midcourse correction 5. And at 152 hours, we want a waste water dump. Over.

SC Okay - there will be no MCC 5 and at 152, you want a waste water dump.

CC That's at 152 hours, waste water dump.

SC Okay, got all that.

CC And Gene - I've got a lot more data on high gain antenna angles for lock up, different attitude, if and when you want them, over.

SC Okay, Jack, why don't you give them to me now.

CC Okay - when you are in the PTC mode, and in a roll angle of 335 degrees -

END OF TAPE

CAPCOM High gain antenna angles for lockup, different attitudes, if and when you want them, over.

SC Okay, Jack, why don't you give them to me now?

CAPCOM Okay, when you're in the PTC mode at a roll angle of 335 degrees, your left-hand window will be pointing at the earth; roll of 065 your right-hand window will be pointing at the moon; at a roll angle of 318 degrees, you should be able to get lock with a pitch of plus 44 and a yaw of 272.

SC Hold it, Jack. Okay, hold it, Jack. Wait a minute, wait a minute. Go. Hit me again with all of that, a little slower.

CAPCOM Okay, when your roll angle reaches 318 degrees your high gain antenna pitch should be plus 44 and your yaw should be 272, over.

SC Okay, you say when our roll is 335 we ought to have the earth out the left-hand window, and when it's 065 we ought to have the moon out the right-hand window.

CAPCOM That's affirmative.

SC And when the roll is 318 the pitch at high gain is plus 44 and yaw is 272. Do you want me to set this high gain on a reacq mode?

CAPCOM That's affirmative, Gene. Once you acquire lock let's go reacq.

SC Okay, fine, I'll try to acquire this next time around.

SC Hey, Jack, what are my reacq angles going to be or do you want me to just read them off the meters and set them up when we lose this lock.

CAPCOM Apollo 10, Houston. On the high gain angles, set them up at pitch plus 30 and yaw 270 and then she'll roll in and then lock in the earth, over.

SC Jack, I haven't been reading you at all but we got high gain lock now so my question was what's my reacq angles?

CAPCOM Okay, Geno, they're plus 30 and 270, over.

SC Plus 30 and 270, thank you.

CAPCOM And we've got high gain lock.

SC Okay, great, Jack.

END OF TAPE

CAPCOM Apollo 10, Houston. We're ready with the P27 update when we can have the computer, over.

SC You've got accept.

CAPCOM Roger, thank you.

CAPCOM Apollo 10, Houston. We're finished with your computer. You can block.

SC Roger.

PAO This is Apollo Control at 146 hours 50 minutes. Flight Director Glynn Lunney and the Black Team now in the Control Center relieving Flight Director Pete Frank and the Orange Team. Apollo 10 184,640 miles from earth; velocity 4,820 feet per second.

END OF TAPE

CAPCOM Apollo 10, this is Houston. Over.

SC Well, good morning, Bruce. How are you this morning?

CAPCOM Good morning. I am fine. Say, I'd like to verify that you are in Manual at the present time on the high gain antenna and then at 4 minutes after the hour GET go to automatic. Over.

SC Okay. I didn't read everything you said. You want me to go to manual?

CAPCOM Go to manual now and then in about a minute or a minute and a half go to automatic and you should reacquire.

PAO This is Apollo Control. Goldstone expects to have good lock-on with its 210 foot antenna at 147 hours 10 minutes, about 6 minutes from now.

CAPCOM 10, this is Houston. We've got a high gain lock now.

SC Roger, Bruce. How far away - how far are we now?

CAPCOM 184 000 nautical miles. Over.

SC Wow.

CAPCOM And range is -

SC The earth and the moon about the same.

CAPCOM Roger.

SC There's an encouraging sign.

CAPCOM 10, Houston. For your information you will cross the equipotential point between the earth and the moon at GET 148:39 and that point is 179 525 miles out from the earth.

SC Roger. Is that about where the computer switches over?

CAPCOM Roger, it's very close. Over.

SC You know, but it's of academic interest, isn't it?

CAPCOM Roger.

SC Bruce, how soon are you going to be ready for the TV show -

END OF TAPE

SC Yeah, but is of academic interest, isn't it?
CC Roger.
SC Bruce, how soon you gonna be ready for the TV?
CC It should be about 5 minutes yet Tom; over.
SC Okay, fine; it'll take us that long to get all set up.
CC Roger, out.
SC And Bruce - would you check and find out what our hydrogen potential is down there in terms of tank loss and also in terms of our purge capability for fuel cell 1?
CC Okay, stand by and we'll get that for you. Apollo 10, this is Houston; over.
SC Go ahead Jack; or Bruce.
CC Roger; with the hydrogen that you have available in both tanks, you have a 20 - that is a 20 hour continuous hydrogen purge capability, which you can split up among the fuel cells any way you like; if you lose 1 tank, and power down to 50 amps, 50 amps, you can get by until 225 hours GET or a little over 30 hours after anticipated splash-down. Over.
SC That's great Bruce. Thank you very much.
CC Looks like you are in good shape.
SC Bruce, I am a little bit confused now about how you want me to handle the high gain now. I am in auto do you want me to go to REACQ (garble). How do you want us to handle the tie in for TV?
CC Stand by.
PAO Goldstone does have acquisition and is ready to receive television when the crew sends.
CC Apollo 10, this is Houston. I've got your antenna OPS plan in.
SC Roger. Stand by.
SC Are you ready for the TV.
CC Roger. We're ready.
SC Hello, Houston, this is Apollo 10. 108 ... 4,000 miles from earth.
CC Apollo 10, this is Houston. Roger we are not receiving the picture yet. I'll give you a mark when it starts coming in here.
SC Okay, we're standing
CC Apollo 10, this is Houston. It looks like we're going to lose your high gain antenna in about 30 seconds. Suggest you wait until we reacquire the next rotation on the high gain. Over.

SC Roger. Okay, will you give us a mark when that will be again. Go ahead. Are those REACQ angles still good?

CC Roger. What we would like you to do is we'll command OMNI DELTA. When we start losing signal strength there and then you should go manual on the high gain antenna. We'll give you a mark when to go back to automatic. And we'll switch you back to high gain. This will eliminate any LOS if you stayed in automatic REACQ we'd have LOS about 36 percent of the time. You are not in close enough yet so that we can get TV on the OMNI. Over.

SC Okay. Great. Sounds great, Bruce.

CC I will give you a call when to go back into auto and try to give you a couple of minutes warning for the TV. I think it's better this way than if you start out and run on TV for a minute or so than have to break it up and start again. Okay.

Sc Houston, do we have high gain right now?

CC Negative, 10.

CC 10, this is Houston. You should be in manual at the present time on high gain antenna.

SC Roger. I am, Jack, I'm waiting for your mark till acquiring high gain again.

SC Roger.

PAO We expect to re-acquire the high gain antenna in about 3 minutes.

CC Apollo 10, this is Houston, over.

SC Go, Bruce.

END OF TAPE

CAPCOM Roger. At 14723 GET we would like you to go to auto on the high gain antenna. We'll expect acquisition almost immediately. You will be in AOS with the high gain for about 11 minutes, over.

SC Oh, that's great. Thank you.

SC What we ought to be able to do is pick up the earth out of Tom's window (static) the moon out of my window at the end of this pass.

CAPCOM Roger, understand the earth out of the left hand window at the beginning and the moon out of the right hand at the end.

SC Let me know when you are going to be making the high gain switch.

CAPCOM You're getting very noisy now. Say again.

SC Roger. Do you have a picture?

CAPCOM Not yet. We've got to get you on high gain first.

SC Roger.

CAPCOM Hey, we got a picture.

PAO Black and white picture coming now.

SC Roger.

PAO Color will come in any second.

SC - 4000 miles out. This is the earth, half earth.

SC And Houston, this is Apollo 10, 184,000 miles out. This is the earth, half earth. It's about - the moon right now. We have practically a full moon. The earth, as you can see it right now, is - the terminator is going right across the middle of the Atlantic. You see that big circular weather belt that goes across the United - east coast of the United States, covers up Florida, and it appears that some sort of point is in the Gulf of Mexico between Florida and Texas. It's just about to make out any land masses and I doubt that you can see any but with a binocular I can see Cuba, Haiti, and the Indies and most of South America which is cloud cover. The central United States appears to be open and as well as the western United States is as far as I can see. The orientation the spacecraft is in is about 90 degrees to our plane of travel. We are pointed up with our axis, I mean propulsion system axis up at the north stars and we're in a rotation collar as a thermal control mode. We rotate 360 degrees at the rate of 3/10ths of a degree per second. And what that means is that first starting with our right window passing through the hatch window and going through the left window and then passing out to the optics, we have the full northern, northern solar, earth, moon plane. And at each revolution

SC -at each revolution, we see the earth passes through the right window, the center window, and the left window, followed by the moon passing through the right window, the center window and the left window and the sun passing through the right window, center window and the left window. And we're transfering from the earth to the moon and you can see what I mean about the term diameter.

CC Okay, 10 now we've got the moon now. It's coming in nicely.

SC Roger. That's the same zoom that you had when you were looking at the earth and you can see the apparent size relationship of the two bodies right now.

SC Well, we have a 3/4 look. I take it all back.

CC Actually on the monitor down here 10, the moon appears to be a little larger in diameter yet than the earth.

SC That's what I says. It's about twice the apparent diameter to me. And it sort of looks tan still to us. You can see in the Sea of Crises very plainly, all the great seas, Serenity and you'd notice the crater structure very clearly all those rough craters down there - the southern lunar hemisphere.

CC Roger. We can pick all of them out of there.

SC How does your color look down there?

CC The black and white is very clear 10, the color looks like it's saturating a little bit on the moon.

SC It's okay up here. Roger.

SC The moon is a very bright body from here. When looking at the moon through the optical system in our spacecraft within about 15 degrees or so of the moon, the stars are blanked out so you can't tell what constellations right now as you're looking this way in the optics. We're behind the moon. Our window system on the vehicle right now is in excellent condition. We can see just as clearly as anyone can ask for, on all side windows.

PAO John Young is the narrator.

SC Okay. In about an hour and 10 minutes we'll be passing from the gravitional potential field of the moon into the gravitional potential field of the earth. So you can see, even though the moon's apparent diameter is larger. The gravitational at traction of the earth right now is just about to take command.

SC We noticed in the TV monitor that the moon has several egg shape bumps and if you're seeing those on your screen, they're not real.

CC There's a few.

SC Around the edges.

CC There's a few. Roger we noticed some. I guess they're characteristic of this particular TV camera you're flying-this unit.

SC Okay Houston. You can watch the moon pass behind the right hand window of the spacecraft. It's rotating around and then it will be probably be able to pick it up through the hatch window. See. There it's going by the window frame right now.

CC Roger. Amazing.

SC That will show us what our rotation rate is basically.

CC Roger 10. We've been timing you down here. It looks like about 3 revolutions per hour.

SC Okay. Now we're looking at the moon out through the center hatch window. This mode of operation for finding out where you are with relationship to the rest of the world for aligning your platform for knowing your relationship with your velocity vector and having a very essential psychological feel for what's going on is excellent. With this kind of an operation -

END OF TAPE

SC Is excellent. With this kind of an operation we always know where we are and where we're going, and even more important, we know where to go to look for the stars which we use to align our platform, and that's necessary for us to perform all our navigational maneuvers and corrections. But right now we're set up on a trajectory which is so good that most of our navigational corrections are really going to be very small, it appears. I'm afraid that we that we're probably going to be seeing more of the moon, as we come back, than the earth because we don't really have, right now, the ability to maintain high gain lock when the earth is in the right, is in the right and center hatch windows, so we're probably going to be showing you the earth only out the left hand window.

CAPCOM This is Houston, Roger out.

SC Going behind the center hatch window now.

CAPCOM Ten, this is Houston, we've got about 1 more minute until we loose you on the high gain.

SC Roger. Well I think that shows what we mean by where we are and what the relationship of the moon, earth system is right now, and where we are in respect to it.

PAO This is Apollo Control at 147 hours 39 minutes. That TV transmission was 11 minutes 25 seconds in duration. We still expect the TV pass, that is scheduled for 152 hours 35 minutes.

SC Houston, this is Apollo 10, over.

CAPCOM Apollo 10, this is Houston, go ahead.

SC Roger, what we are doing now is in a temporary hold here for storage and securing. I think we are ending up bringing back more than we took.

CAPCOM Roger, we'll be asking you some questions about your storage in a few minutes. We were getting organized to run through LCL here with you over.

SC Roger, further more it is quite clear to me that if you pack up a food bag, when you open it up and eat the food out of it you've still got more stuff to dispose of than you started with.

CAPCOM Roger, the surgeons --

SC What I'm saying is right now -

CAPCOM The surgeons are wondering if you have negative intake or something.

END OF TAPE

SC But will we - what I wonder is how we're going to get 15 pounds in a 10 pound sack? In scientific terms, Bruce, that is known as a blivet, over.

CAPCOM Houston, roger. Out.

PAO Apollo 10 is 181,779 nautical miles from the Earth. Velocity 4,846 feet per second.

CAPCOM Hello Apollo 10, Houston. Over.

SC Hello Charlie. How are you?

CAPCOM Pretty good, Gene. How you guys getting along this afternoon?

SC Pretty good.

CAPCOM Sounds good. Hey, we got a couple of items for you if you'll break out your LCL recovery check list, I'd like to go down where you've got the items returned and the storage location just by item number. Over.

SC Charlie, but we're not quite ready to do that yet. Can you hold on, it may be a couple of hours?

CAPCOM Roger, we'll hold off until tomorrow, whenever you get ready. We're standing by, retro's interested. Also the people in the back room have been working for 3 days on the water bag and we got a procedure for you that has been refined on separating out the bubble if you want a lot of exercise. Over.

SC Go ahead with your procedure there. Over.

CAPCOM Well good. I didn't know whether you wanted that or not. First off, it's quite lengthy. It's a full page. I'll try to go through it slowly and we can talk it through and then ask some questions. First off, fill the entire bag both top compartment and bottom compartment about half full of water. Then work the water and the gas to the lower compartment by either spinning it or just kneading it down. Then after you get it all in the bottom spin it up and then let it come to rest slowly and if possible then squeeze the gas, if you have any gas in the upper compartment, squeeze the gas out of the upper compartment. Then if the bubble is present in the lower compartment and top compartment is empty add some more water to the approximate size of the bubble. Then you want to spin it up again as in step - well as in step three. Now, after you spin it up again, you should have gas in the top or partially gas in the top and gas and water in the bottom and repeat the procedure. Add more water to approximate bubble size and spin it again. And by the time you get finished you should have all of the gas in the top and - compartment that is, and then the bottom compartment should be just about full of water. And if you fill it too full, so you got the bottom full of water and the top full of

CAPCOM water - partially full of water then the only way you can get that bubble out of there then is to squeeze out the bubble and the water in the top compartment. The object is to get the bottom compartment completely full of water and the gas in the top compartment and then you can vent it off by pinching off the lower compartment. If that sounds reasonable to you guys you can try it. It's going to take a lot of spinning but that's what they recommend in the back room after three days. Over.

SC Hey, Charlie. With all due respect would you play back Glynn's tape recorder in there on his desk and listen to it yourself and then give us a call.

CAPCOM Okay. I guess you couldn't understand that.

SC No, we understood it.

CAPCOM I told you you might not want this.

SC Listen, Babe. I'm glad that's all we got to worry about at the moment.

CAPCOM Me too, Gene. We had this thing here and if - that was the only recommendations we could come up with and as I said if you wanted lots of exercise you could do it but if not - you know the general principle of the thing and it's your druthers, adios.

SC We appreciate the homework that was done on it. Here we are with this thing now, Charlie. Now what do we do with that bag that's down in the bottom. I mean that bubble that's in the bottom.

CAPCOM Have you got all the water out of the top?

SC Yes sir.

CAPCOM Okay. Is the bottom part -

SC I got all the water in the bottom and -

CAPCOM I understand you got all the water in the bottom. Now is the bottom compartment completely full of water?

SC Yeah.

CAPCOM And its still got a bubble in it, right.

SC Yeah, its still got a bubble in it.

CAPCOM Okay. Then it's not completely full of water and what you want to do is add some more water and spin it again.

SC That didn't work.

CAPCOM Hey Apollo 10, Houston. You still swinging the bag?

SC Stand by, Charlie. Over.

END OF TAPE

SC Houston, this is 10, over.
CAPCOM Apollo 10, this is Houston, go ahead.
SC Roger, I've got the bag, the bottom half of the bag full of water, and there is a little water in the top of the bag but everytime I rotate, and rotate and rotate, no matter how much I rotate that water in the top won't go down in the bottom and that bubble in the bottom won't come up to the top.
CAPCOM Stand by I'll put the bag man on. This is your bag man.
SC Roger
CAPCOM Go ahead 10.
SC Go ahead, Charles.
SC I think I've said enough today about that water bag. I think we ought to forget the whole thing.
SC You know this doggone water and these bubbles, they stick to each other, or something, I get the feeling that is what is going on in here.
CAPCOM I think you're right, John. We tried it out in the back room in the good old 1G and the thing worked fine, and I appologize profusely for that procedure and we, I think we ought to just forget it, over.
SC It's no problem.
CAPCOM Okay fine, that's really -
SC Should we try it -
CAPCOM Go ahead.
SC We'd try it. If it would work we'd sure use it. I think, and we tried it but like I say we got a problem here with a bubble that's still down in the bottom and the water being on the top. The two are just not going to mix.
CAPCOM Roger, like I was saying. I think if you'd really rotate it for quite a while, the stuff would finally, eventually work its way down but it takes a lot of exercise, at least it did down here in the back room and I don't really think it's, it's up to you guys if you want to continue to spin it. You've got the basic procedure down, and we'd better be quiet, over.
SC All I can think of when I look at this bag is, is this what's going on in my stomach with these bubbles and this air. Because if it is, that stuff is just sitting in there floating.
CAPCOM Roger.
SC It won't go to the top, and it won't go to the bottom.
CAPCOM Roger, it sounds like we've got a little problem there. Hey, I'd like to change the subject to talk about the LM cameras. We recommend, wrapping up both cameras individually, and putting them in compartment A5. That's the Hasselblad and the sequence.

SC Roger.

CAPCOM And for the ECS canister we recommend you roll it up in any kind of a plastic material that you can get hold of to prevent it from, a term they call, breathing all over everything, and I guess that's just seeping out. After you've done that you can, recommend you roll the canister up in the third sleeping bag, and that's the one without the fittings on the end, and then stow it in food compartment L3.

END OF TAPE

CC --fitting on the end and then stow it in food compartment L3 and the helmet that should have gone in L3 stow in on a suit and put that under the left sleeper -- correction -- stow it in the left hand sleeper restraint and stow with the helmet in towards the hatch. Over.

CC Around the end, towards the hatch. Roger.

CC Okay. That's all we got.

SC Charlie, Roger, we'll do that the final day. We're using these sleeping bags and they are really great at night. And you want to leave the suit in that restraint bag in its position? Over.

CC That's affirmative. Leave it as it reads here in the procedure, stow helmet plan to be stowed in L3 on the suit and the suit to be stowed in the left hand sleeper restraint attached to normal use fittings. And stow the helmet into the suit towards the hatch. Over.

CC Understand.

CC 10, Houston, just talked with the surgeon and the concern with the canister is that the lithium hydroxide getting out into the cabin so if you haven't already done so, we recommend that you wrap the canister in some plastic material and tape it up. Over.

SC Do you - got any idea where we get this plastic material?

CC Roger. We recommend food bags or pickle bags and tape as required. Over.

SC Okay.

SC Houston, Apollo 10, Over.

CC Go ahead, Apollo 10.

SC Roger, Bruce. Charlie there? I want to talk to him for just a minute.

CC Yes, indeed.

CC Go ahead, Tom.

SC Hey, Charlie, I just want to - before I give you a chance to settle down, I just want to amplify one thing that happened back there in the states Snoopy, you were right on that switch position, but on a three position switch, we finally figured it out later, for LCSI. We went to the switches okay, but I floated up and had one restraint harness down. You know how you can look into a simulator from different positions and how they switch - positions looking different in positions? Over.

CC Roger.

SC Okay, well I put my finger on the switch and I was pointing up a little bit and looked down and it looked like it was in that hole, but stretched down a little bit and it turned out it was in the other position. Anyway, as soon as it happened, we caught it and real fast it went into gimbal lock and got all squared away for the burn within about 30 seconds. So you might pass that on down to Chris and Deke. And we went through the procedures outlined and my finger was on the switch and everything but just -- in fact, like you know on the command module at the ATT 1, Rate 2 switch and from where you are standing it could be either in Rate 2 or ATT 1 Rate 2. Over.

CC Roger. We copy, Tom. We thought that was a great recovery and we'll pass this on. Over.

SC Yes. Roger. Our procedures were right and in the LM with those hoses you ride a little high and I was held down with one restraint harness at the time. I was on my tiptoes and I looked down and put my finger on the switch the line was lined up with that hole. If you'd actually get down lower, quite a bit lower, you'll see that it is lined up there. And normally on three-position switches you don't flip them back and forth all the way to justify the position. Over.

CC Roger, Tom. Copy that. I know it is real easy to do and we'll pass this on. All I can add is it was just a great recovery. And it came out real great. You guys did a great job. Over.

SC Roger. Charlie. We were like Speedy Gonzales there. We were squared away in attitude real fast and then made a pitch in to avoid the red cherry and bang we were over in the attitude back again in about 30 seconds, 40 seconds and all set to go.

CC Roger.

SC Like in here right now. It looks like the B mags are uncaged but they are in fact caged. It's just the way those switches look.

CC Roger. We copy. We figured something like that had happened. I was going to say we figured something like that was going to happen. Go ahead, Gene, I'm cutting you out. Excuse me.

END OF TAPE

SC That's all right. Things were getting a little slow at that point anyway. We thought we'd add to the excitement. They really added to it, I'll tell you that. Charlie, this is Tom again. I want to say - Roger. Sorry about cutting you out but I just wanted to say again, we thought you did a great job on CAPCOM and all of the support people getting the pads up to both spacecrafts and coordinating. I know that you're like the left handed paper hanger and everything else but it really worked out smooth that day and I think we really tested the total system. Over.

CAPCOM Thanks, Tom.

SC It's really beautiful.

CAPCOM Okay, thanks a gob you guys. I know that we had a lot of good guys in the room here looking at it that day and it was a great team effort all the way around. You guys did a great job and we're just real pleased the people under the flight. It was really a great day last Thursday.

SC Yeah. What I appreciate was that quick recovery from that state vector. They zaped me a new one like nothing flat. That was beautiful.

CAPCOM The trench is all listening. We'll pass it on to the guys and I agree with you those guys were really on top of everything throughout the whole day.

SC Charlie, another thing about the LM. We'll discuss it, of course at length, but you know that S-band antenna worked far, far better than I ever thought it would and I think it worked far better than a lot of people thought it would.

CAPCOM We were certainly pleased with the operation of the steerable. The comm was really fantastic. Our only bad pass was during phasing and we, of course, are disappointed in that pass of comm. I've heard something that we might have had a side low block on there but its not been confirmed yet. We were disappointed with the omnis a little bit but not too much.

SC The capability of the high gain to lock on and go to auto track with a firm piece of signal was great. That was just tremendous.

CAPCOM Well, it looks like old Snoop performed in a great style throughout the whole day. Over.

SC How's he doing now? Is he still on his way?

CAPCOM Last we saw of him he was on his way toward the Sun but we lost him at about 121 hours or there abouts. He was still perking along.

SC Well, we got an American flag and every state in the union has got a flag in Snoop going around the Sun.

CAPCOM Great news, 10. Just went by to visit the gals and everybody's in great shape on the home front. Over.

SC Very good. Thank you.

CAPCOM 10, Houston. If you got a couple of more minutes to talk, the back room would like to know - they've got some questions for you so they can get one leg up on LM 5. The first one concerns on the operation of the LM steerable antenna during the phasing burn pass. It has 3 parts to it. I'll ask the first part. What were the circumstances surrounding loss of S-band steerable from AOS to the phasing burn on rev 13? Over.

SC Charlie, I don't know what the circumstances were but we had good lock when we came on down and good S-band lock and I could hear you. You can hear that S-band tracking because of the noise it makes and I heard it tracking. And then I got somewhere down in there in the process of our comments and photography work and what have you, I heard us losing lock and I went down there to look at it and I tried to tune it up with the manual, tried to tune it up and the fact is - I'm not sure whether we had a capability call on verb 64 but I played with it a little bit there for a minute or so. I couldn't do that. I went to OMNI's so that we would at least have voice with you and then I guess it was after the phasing pass when I had a breather then I went back and we called up verb 64 and I got high gain lock again and that's really all I can tell you.

CAPCOM That's fine, Gene. Second part of this question was, what was your procedure when the antenna went into the stops and the circuit breaker popped? Over.

SC Well, when it inadvertently went into stops I put it at pitch 90 yaw zero, pushed in the circuit breaker and it popped right around on 90 and zero and we started over again. That happened about 3 times. I think once during a P52, twice during a P52 and one other time. Tell your girl Chelsie that it stopped one time when it shouldn't have.

CAPCOM Roger, we copy. One further question on the antenna. When did you switch to the auto mode? Was it within about 1 minute after AOS on that phasing burn pass? Over.

SC (Garbled) You know I came on in OMNI's and I heard John give you a go for DOI and then I gave you the DOI burn report and it was after that that we went to high gain lock.

CAPCOM Roger.

SC So you know we had a good high gain lock there. We had a good high gain lock there for a while.

SC I believe you were getting the high bit rate data.

CAPCOM That's affirmative. I'm pretty sure we were. The telcom's not here now, of course, but we can run back by them. I'm pretty sure if I recall the circumstances we had high bit rate during the early part of that phasing pass. I know because - well I know we did because we got you a state vector and I read - correction that was the rev before. But anyway I can remember seeing some high bit rate data and then at sometime we lost it and I don't know why. That about exhausts our knowledge on that question. The other one was the - 2 part question on the drinking water. Was the gas noted in the LM water only during the initial use of the system? Over.

SC It was initially when I first went in on the first day. There's no question about it. It got less and less but even after we egressed we took some big gulps of water and there was still some bubbles in it.

CAPCOM Roger, we copy. Second part. Was any gas noted in the Command Module potable tank prior to diverting fuel cell water into the potable tank? Over.

SC Charlie, did you read that.

CAPCOM Gene, I must have cut you out. I was asking B part on the LM water - correction on the Command Module potable water. Was any gas noted in the Command Module potable water prior to diverting fuel cell water into the potable tank? Over.

SC Roger, Charlie. That was - in fact when we started to take our first drink of the water that had been serviced at the Cape it was as bad as its been ever since. In fact, it might have been worse than the first day. So the first servicing that they gave it at the Cape probably did not have deaerated water or was not deaerated properly because - the fact there was tremendous amounts of air in that water when we first started to drink it after TLI. Over.

CAPCOM Roger, we copy 10. Final question that's written down here was on the VHF simplex A. Did simplex A come on immediately upon switching from simplex B to simplex A when you rechecked behind the Moon on the 12th rev? Over.

SC That's affirm. It did. That's affirm , Charlie. And as soon as we got simplex A we went ahead and tried the LM duplex A, Command Module duplex B capability from the LM not in the voice range and but just the voice to make sure we could that duplex mode for the ranging capability and that also worked.

CAPCOM Fine. Great show. I don't understand what was wrong with this when we first tried to check it but we're sure happy that it fixed itself because the ranging really -

END OF TAPE

CAPCOM Try to check it but we're sure happy that it fixed itself because the ranging really looked like it worked like a champ, during the whole rendezvous. I've got a question. What exactly, had the AGS started you off in attitude before you staged, or as you staged, or right before you staged? Over.

SC Okay, you know our procedure. I throw the staging switch after Gene throws the com B47 G thrust forward two feet per second. Then he starts, starts aft 2 feet per second. Then just as he starts forward, I throw the switch. Okay, what happened, it started to go off a little bit as we started aft and then as he started forward and I threw the switch we got on the ascent stage, it just took off, and then that's when I grabbed the hand controller and then the gimbal lock and got squared away. But it was just, you know the LM is actually, it has sharper maneuvers than the simulator. We noticed that right away, so the basic deviation that we started in didn't alarm us too much, just when it started wiggling a little bit. We thought that this might happen. Right, with the whole mess on that descent stage it started off a little bit, but it was so slow we didn't notice, and we wanted to go ahead and get the staging for the lunar, we staged and went to the ascent stage. It really went bang in a hurry. Over.

CAPCOM Okay, Tom, thanks a bunch. It was really a fill in for just me and also Fido was curious as to what kind of Delta-V we gave to the descent stage when we separated and that clears that point up. That's all we got for you right now. If you guys can think of anything else that you'd like to pass on that we could get a leg up on, we'd appreciate it, over.

SC Okay, Charlie, I've got one. It was the same squawk that was noted on Gemini 9, pardon me, I mean Apollo 9, that kind of dates me doesn't it. On the LM on the rate air needles. You know they squawked at, when the rate air needles were zero, actually you had some rates, well we tried to get that calibrated, you know in the testing there at KSC, when I got in flight I found that's why I used a little more fuel, particularly during the landing radar test. I pulsened the error needles into zero but on half rates. Right at the last we calibrated them before docking, and when the spacecraft had zero rates my yaw rate error needle was about 3 tenths of a degree to the right. I'd estimate the pitch was 2 tenths down and roll was about 2 tenths, so when I came down for the landing radar pass, and I don't know if you could see my DSKY on verb 83. I was trying to pulse it and hold it just as close as I could to take some pictures on zero needles the thing would start to go off right away, then I'd have to get back on it. But that is one thing that definitely needs to be corrected and again the main thing it costs you is fuel. Over.

CAPCOM Roger, we got that, thank you much, Tom. I was always under the impression that those needles were supposed, should have been zero except when power off but it looks like we had problems just like, as you say, just like 9 did. By the way the, I don't know whether you've heard but the landing radar appears to have worked like a champ. We had, as far as I can tell, we still had indications of lock on it about 68 thousand feet over.

SC Right, and a good show. You know we had some time there, so what I did was turn the radar on early and pick up that attitude, and as soon as I pitch down, boom I could see the tape meter started to drive and also the velocity started to go the other, well of course the velocity didn't lock on till later but right away it looked like we had altitude lock on way, way higher than we expected, over.

CAPCOM Rog, thank you much, 10, that's all we have for you right now out.

SC Charlie, I've got another thing on the S-band signal stregnth. It appeared that any time you caught the angles, and all the angles that we had preprogramed in the flight plan and the verb 64's were excellent, but it appears that anywhere between 34 and 36 that you got that kind of signal stregnth and went to auto, she'd acquire and pop right up to about 43 or 44 on the signal stregnth meter, but even better than that if you call up the angles and you can tune it in manually very easy from that 34, and 36 well into the 40 region and then of course go to auto check and it popped up to about 43 so that was very encouraging also. One other question that puzzles me. I updated the AGS prior to docking with the PGNCS, and I could never get the data out of address 304 in the AGS to agree with verb 83 as they checked on the update. I then updated the AGS 2 more times before we undocked and it still disagreed by some 20 to 30 degrees. As soon as we undocked I checked those angles again and by golly they were perfect and the AGS held good update for a long time so I don't understand what the problem was prior to undocking.

CAPCOM Roger we haven't found the answer to that one Gene. You passed that on to us right at, as you came around AOS, and we've been working on it, but we haven't heard the answer on that one. We're still working that one. Over.

SC Okay, and in the lunar environment never once did 407 go to 10 thousand, it would stay zeros all the time, which was expected, but contrary to earth orbit environment.

CAPCOM Rog, that's good news, thank you much.

APOLLO 10 MISSION COMMENTARY, 5/24/69, CDT 16:30, GET 148:49, 501/3

PAO This is Apollo Control at 148 hours 49 minutes. During that inflight debriefing there Apollo 10 did pass the equal potential point between the earth and the moon. Has now left the lunar sphere of influence, and is in the earth's sphear. That occured at 148 hours, 39 minutes, 3 seconds. We copied the distance from the earth at that time of 179 thousand, 5 hundred 24 nautical miles. Velocity 4 thousand 8 hundred 69 feet per second. distance from the moon at that time was about 33 thousand 8 hundred 20 nautical miles. The Atlantic recovery forces ships and aircraft will be released at 153 hours elapse time. We have nothing further for the crew at this time so we will take down the loop now and come back up if there is air to ground conversation. This is Mission Control, Houston.

END OF TAPE

SC Hi, Roger. We've got a little coat of moisture all over the upper hatch and it's fanning out

SC -in small bubbles in 1/8 to 3/16ths in diameter, very flat against the whole underside of the hatch and we've been wiping it down at intervals. And the temperature in the tunnel is 20 degrees cooler. And it's very nice.

CC Roger. We copy. How is the overall cabin temperature?

SC That's very nice too.

CC Okay.

SC This is WAP 10 broadcasting from the strongest station in the world from 200,000 miles out saying hello to our favorite Flight Director and to one of the most outstanding teams in the world that we've ever been associated with. If you have any request, just give us a call. This is Tom, John and Gene with your morning music.

CC Oh Roger to Tom, John and Gene show, I don't know where you guys get this morning music bit though.

CC This is morning for you all.

SC Isn't it 6:00 O'clock in the morning?

SC I have 10 after 6. Is that-

CC Would you believe-

SC Is that AM or PM.

SC Would you believe it's PM down here?

SC Okay. This is Tom, John and Gene evening show.

CC Laughter. Roger out.

SC That's not bad 200,000 miles for a volt and a half.

CC Right. That's very good.

SC We can't handle all requests because our-

CC You certainly got the hottest show.

SC Our library is limited however, so we- I want to say we can't handle all requests because our library is somewhat limited but we'll do our best when the occasion arises. Over.

CC Roger. You certainly got the highest antenna around. Over.

SC Houston. Apollo 10. Did you give us something specific to wrap in the LCG?

CC Roger. We were looking for the ...Stand by.

CC 10. This is Houston. Negative. We have nothing specific to be wrapped in the LCG with reference to the Hasselblat in the sequence camera. I'll ask you to put them temporarily in compartment foxtrot 1 and foxtrot 2 and after removal of the unsuited reentry provisions to wrap individually those cameras and available garments and store them in compart alfa 5. Over.

SC Roger.

PAO The LCG is the liquid cool garment.

END OF TAPE

SC Houston, Apollo 10. Over.
CC Go ahead, Apollo 10.
SC I'm looking a little ahead on the flight plan to the star landmark sightings and I'm wondering what kind of W matrix you want in there before we start that.
CC Stand by.
SC Is this the same W matrix data for the set of P23 no comm cases around about that time?
CC Stand by a minute, please.
CC 10, this is Houston. On Page G 1-71 on the checklist we've got the W matrix that you are looking for. Over. That's in the CMP section. You copy.
SC Roger.
PAO Apollo 10's present distance from the earth is 187,314 nautical miles, velocity 4,960 feet per second.
CC 10, this is Houston. On that W matrix, when you punch up Verb 67 we expect in R1 and R2, you get the values showing up in the flight plan and we need a 4 balls 3 in R3. Over
SC Stand by.
SC Say that again. Over.
CC Roger. On this W matrix. When you call out Verb 67 on Page 1-72 on the checklist, you'll get values in R1 and R2 which are the ones that are already in the flight plan, that is 3 balls 94 3 balls 57. Now you need loaded in R3 plus 4 balls 3 to put you in cislunar W matrix. Over.
SC Roger.
CC Houston out.

END OF TAPE

SC Can you read me now?
CC Loud and clear.
SC Hello, Houston. Apollo 10. Over.
cc Apollo 10, this is Houston. Go ahead.
SC Roger, Bruce. On the flight plan of 150 I've got the temperatures on the command module RCS thrusters when you are readv to copy.
CC Roger. Go ahead.
SC Roger. 5 Charlie, 4.90, 5 Dog 4.45, 6 Alpha 4.50, 6 Bravo 4.80, 6 Charlie 4.40, 6 Dog 4.70. Over.
CC This is Houston. Roger, I believe we copied it correctlv one time through. Thank you.
SC Roger. The babies are nice and warm. Don't need to heat them.
CC Right.
SC Hello Houston, Charlie Brown.
CC Go ahead.
SC I'm just interested in what vour plan of attack is for the next day and half on the use of fuel cell 1. We are going to crank it up after it cools down to a certain point and use it for awhile and then shut it off or how do you want to handle it? I notice it is getting down now to a - oh, I guess around 390 degrees, 80 or 90 degrees?
CC Stand by, 10. EECOM is coming over.
SC Okay, Charlie. I just wanted to the feel for - what you are thinking about.
CC 10, Houston. I got the words on the fuel cell. Over.
SC Go ahead, Charlie.
SC Roger, Geno. We'd like you to put fuel cell 1 on main A and Main B at this time and keep it on line until we -- for about an hour or so -- until we hit TC420. Then the thing has been decreasing about 4 degrees per hour. That means we'll have to cycle it again at about 165 hours for another hour. Over.
SC Okay, Charlie, I'll go ahead and put it on our Main A and Main B now. Thank you.
CC Roger. It'll take about an hour and should be up to about 420 or so.
SC Okay.

END OF TAPE

SC Looking good here, Charlie.
CAPCOM Roger. looking good here.
PAO This is Apollo Control at 150 hours 12 minutes showing a distance from the earth for Apollo 10 of 175 thousand, 64 nautical miles. A velocity. 4 thousand, 920 feet per second.
SC Houston, 10, over.
CAPCOM Ten, this is Houston, go ahead.
SC Roger, I was just thinking about that land mark tracking yesterday. Were you guys taking, was that the 2 revs of tracking state vector that we were getting? And then we came around to the landing site and marked on it, that would give us an indication of how good our targeting was.
CAPCOM Stand by.
CAPCOM Roger 10. The information, that you requested was. that your vector was based on the radar tracking from the 2 previous revolutions, over.
SC Roger, so if we were repeatable on that land mark on site 130 that would be an indication of how close you were getting it, probably, huh?
CAPCOM Roger.
SC Or not, I don't know, probably not. Fido down here is nodding yes, that it would be an indication of how close you were getting it.
SC Okay, thank you.
CAPCOM 10 they have local solution running down here at the same time, and the results that we were getting were consistent with the results that you were getting and the land mark tracking exercises were shut up so that if properly executed the values would be repeatable, over.
SC Understand. I guess it was repeatable because that site never moved the whole time I was watching it.
CAPCOM Roger 10, that's what our reduction of your sextant data said too. It gave us the site in a fixed location from rev to rev.
SC Outstanding.
SC Hello Houston, 10. On that fuel cell. did you say you want me to go ahead and take it off the line at 4 20 or you want me to wait for some more from you?
CAPCOM Roger, we'll keep our eye on it down here, and give you a call. However the value we're working towards is 4 20 and if you see it first there's nothing to stand in your way of taking it off.
SC Okay, Bruce, how about calibrating me right now. I'm reading about oh, 3 90.
CAPCOM Roger, we've got 378.5 on our TM here.
SC Okay. Fine, thank you.

CAPCOM We'll keep track of it for you.
SC Hello Houston, Apollo 10.
CAPCOM Roger, 10.
SC Roger, we're still just very gently rolling out here and have a beautiful view, we'll be able to show you on our scheduled TV pass and again from this distance as we look back out at the moon there. the basic color of the highland light area is a tan and the Mare area is a brown, and again that area I pointed out this morning, you can still see a difference. One looks more like a chocolate brown, the other looks more like a light, shall we say a chocolate milkshake and the colors haven't changed out this far, over.
CAPCOM Roger, those last ones that you were referring to, were they maried out on the south west area of the moon?
SC That's right Bruce, when I showed you that, the line of demarcation between those two flows, over. By the difference in color, over.
CAPCOM Roger, I caught that this morning, and that line of demarcation is really very clear down here, and just to confirm -
SC Roger.
CAPCOM - the TV pass is still 152 hours 35 minutes before 5 minutes is that correct?
SC That's what we've got in the flight plan. It looks like we're right on it and everything's looking good and John's going to go ahead with some of his work here, over.
CAPCOM Roger.
CAPCOM 10 this is Houston, on your waste water dump we currently have it scheduled at 152 hours GET. We're trying to get some photographic observations of this dump. The east coast of the U.S. is pretty well overcast and we've received some requests to schedule it at 153 30 we're wondering how you feel about th-

END OF TAPE

CAPCOM - to schedule it at 15330. We're wondering how you feel about this and whether you were planning to go to sleep in accordance with the time line? Over.

SC Okay, stand by. Over. Roger, that's no problem and we really feel in great shape and we might stay up a little bit later than the programed sleep period today. Over.

CAPCOM Roger. If it's agreeable with you we'll schedule the waste water dump for 153 hours, 30 minutes. Over.

SC Roger, sounds good for us.

CAPCOM Houston out.

SC Okay, Houston. This is 10. We're going to stop TTC right about here looking at the Moon so we can do some star landmark tracking.

CAPCOM Rog.

SC Houston, 10. What kind of high gain have you got locked at this point?

CAPCOM Stand by. Roger, 10. We're on OMNI delta right now. Your present attitude is not compatible by high gain.

SC Okay, fine. Thank you.

END OF TAPE

SC Houston, this is Apollo 10. Over.
SC Houston, this is Apollo 10. Over.
CC Go ahead, Apollo 10.
SC Roger. I don't know if you can see my DSKY of not, but this thing never even come close to pointing at Taruntius P and I just wonder if I should just go ahead and accept this mark.
CC Stand by.
SC I marked it right into Taruntius P, I know.
CC Roger.
SC Did I have the, Did I have the latitude and longitude of the thing loaded right? I checked that.
CC Roger, 10. We were watching down here. All the loadings seem to be correct. We suggest that you go ahead and accept it. Over.
SC Okay, Houston. you had better throw away that first one. Somehow that noun 89 got rewritten in there.
CC 10, this is Houston. Guido says that when you recycle, the data begins to write over what you've got in the cell and the program is performing as anticipated. Over.
SC It's not performing as I am anticipating.
CC Houston. Roger.
SC I mean anytime it writes over a noun it's already - just finished putting in there, there's something wrong.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, CDT 19:02, GET 151:13 508/1

SC Houston, do you want us to delay for this data that's coming down, or are you getting it anyway?

CS Roger, 10 if you could slow down just a little bit more at the noun 49 point we'd appreciate it. We're having a little trouble copying it.

SC Okay.

SC The problem is that this thing, if you're marking on something that's been in there before, it's got to 0 mark it on second vector. It has no other land mark noun 89 in there rather than the first one.

END OF TAPE

PAO This is Apollo Control at 151 hours, 39 minutes. Apollo 10's distance from the Earth is 170,829 nautical miles. Its velocity is 4,974 feet per second.

SC Houston, Apollo 10. Over.

CAPCOM Roger, 10.

SC That completes the star landmark - the first set. If I wasn't - if I hadn't messed up on that first one that would have probably been pretty fair.

CAPCOM Roger. We're writing the data now. We'll have an analysis on how it all worked out for you in a few minutes. Over.

SC Well, from a pilot's standpoint, it's far easier than star horizons. Boy.

CAPCOM Roger. When you got a minute.

SC It's just -

CAPCOM Roger, 10. When you have a minute we got a maneuver pad for you.

SC A maneuver pad? I though you scratched that last maneuver?

CAPCOM Roger. We've had a minor revision here. We have scratched midcourse correction 5. Over.

SC Okay.

CAPCOM You ready to copy?

SC Roger, go ahead.

CAPCOM Roger. This will be midcourse correction 5 alpha. Waste water G&N 25240 pitch and yaw trim not applicable. GET ignition 153300000. Noun 81 NA. Roll 326171060. Noun 44 self lima, alpha, romeo, golf, echo. HP Bravo, Echo, Tango-Tango, Echo, Romeo 00001. Burn time is 10 minutes, 04 seconds. Delta VC NA. Sextant star 230669297. Remainder of the pad is NA. Knowledge remark. Monitor in POO, do not trim residuals, shut down manually at 10% on the waste water pudge.

END OF TAPE

CC -flue. Do not trim residuals. Shut down manually at 10 percent on the waste water pud. For your information, this will change your entry angle from approximately - 6.9 degrees to approximately -6.8 degrees. Over.

SC Roger. I got everything. Would you repeat the second line of NOUN 44 please?

CC Which line?

CC Roger-

SC NOUN 44.

CC Roger. The second line of NOUN 44 HP is bravo echo tanco tango echo Romeo. Over.

SC Roger. I had that. I just wanted to make sure.

CC That's all right.

SC Okay. MCP 5 alfa. MCP 5 alfa is waste water G&N 25240. Noun 48 is NA. Noun 33 is 153 3 zeros 0000. Noun 81 is NA. Roll 326171060. Noun 44 is nema alpha rodeo George echo bravo echo tango tango echo Romeo. Delta VP is 4 balls 1. Birdseye is 104. Delta VC is NA. Sextant is 230669297. They'll be no ullage or a monitor and POO. We will not trim. We'll shut down manually at 10 percent and better not. Never mind.

CC Roger. Readback correct except that due to the exceptionally long burn time here the pad entry doesn't take the amount of time we're looking for. We need 1 zero minutes and zero 4 seconds unfortunately. We're working on your over burn criteria.

SC Hey do you want to go to the Mission Room for this one?

CC Roger. Did not burn to deflation.

CC 10. What we're looking for is if it's convenient to maneuver to this attitude, we think we can improve your entry angles just a little bit. If it's not convenient, why you can do the dump in any attitude you happen to be in. As it shot up, this will give you, I guess, about a 10th of a foot per second translation plus X.

SC My golly. We'll be glad to maneuver to the attitude. Anything to improve that angle.

SC Oh it sounds pretty darn good right this minute.

CC Roger. And I -

SC I understand the world is going to be watching on this one to try and track it.

CC Suppose to be.....

CC And we show fuel cell 1 skin temp at about 421 degrees now. You can take fuel cell No. 1 off the line and I don't know if you put the potable water heater back on or not-it looks like you can carry that load with no problem if you want to warm up some water for meals. Over.

SC Okay Jack. I'm taking, we've got the potable water heater and I'm taking fuel cell 1 off at

SC this time.
CC Roger. Out.
PAO This is Apollo Control. That last transmission all concerned the waste water dump. I guess you could call that a combination of spaceage humor and a little test that the flight dynamics officer would like to perform. In the proper attitude, he thinks they'll be enough energy in this water dump to add about a tenth of foot per second.
SC Did you give us an attitude that would be good for this TV pass so we get the moon out one window and the earth out the other window if feasible?
CC Rog. FAL just handed it to me. Recommend roll of 338, pitch 270 yaw 000. That puts the high gain at pitch 019 yaw 272. This is pointing south- gives us more time as the earth is in the window, over.
SC Roger. We're going to go to the south orientation now, huh?
CC Well - if you'd rather, give us some more time, This orientation we get the earth into windows more of the time with the high gain. Over.
SC Roger. Let's do it then.
CC Okay.
SC Houston, this is an attitude to go for the TV pass, right?
CC It's affirmative.
SC Charlie. You don't want us to start up PTC untill after the waste water dump? Right.
CC That's affirmative. If you could hold off on the PTC until after the dump.
SC Okay.
PAO Apollo 10's present trajectory gives an entry angle at the earth atmosphere interface of minus 6.9 degrees. Perfect is minus 6.5 and it can be plus or minus 1 degree. With this water dump in the attitude we called for there Fido thinks he can add about a 10th of a foot per second and perhaps get the angle down to minus 6.8 degrees from minus 6.9. Therefore, the water dump was passed up in the form of a maneuver pad.
PAO And at 152 hours, 3 minutes we're showing Apollo 10's distance from the earth to be 169,669 nautical miles. Velocity 4,990 feet per second. This TV transmission is scheduled for 152 hours, 35 minutes approximately 1/2 hour from now.

END OF TAPE

SC Hello Houston, this is 10.
CAPCOM Go ahead 10, Houston.
SC Okay, I just hit command reset so I can get my high gain back and you're locked on auto track narrow.
CAPCOM Affirmative.
SC Hello Houston, Apollo 10.
CAPCOM Go ahead.
SC Roger that 52 30, could you give us that 52 30 when we start this pass, could you give us our distance from the earth and also our distance from the moon and our relative velocity, over.
CAPCOM Roger Tom, we'll be with that, get that up to you just in a minute.
CAPCOM Apollo 10, this is Houston, over.
SC Go ahead, over.
CAPCOM Roger, I've got your distances from earth and moon and velocities when you're ready to copy.
SC Go ahead, over.
CAPCOM Roger, distance from the earth, 168,375 nautical miles. Velocity with respect to the earth 5008 feet per second. Distance from the moon 45,313 nautical miles. Velocity with respect to the moon 5048 feet per second, over.
SC Roger, so we're pulling away from it, huh?
CAPCOM Yes indeed. And are you all making plans to consume any food before turning in this evening. We don't see it in the flight plan.
SC That doesn't mean we won't do it because he left it out of the flight plan. If we get hungry we're going to eat, over. Listen there's no place in the flight plan to put snacks either but that what we've been doing.
CAPCOM Roger, the motivation for that is that Deke is sitting down here at the console and he says he is hungry.
SC Deke must have been using that exergene, over. Tell him, see if he can find a good candy bar out there in the -
CAPCOM No, he's only going to eat if you all eat.
SC Okay, well we've consumed most of it up through, starting on day 6. We're about on meal B of day 6 and we have about 2 meals that are not consumed out of that total number.
CAPCOM Roger understand.
SC Tell Deke he's really missing something if he doesn't combine that water, that food with water that's filled full of gas because that's really a thrill, over.
CAPCOM Roger.

SC Hey Bruce, that star land mark, we never did any of that in the simulator and we never had any way to practice it and all we've ever done is star horizon, but my opinion of that as a task is that it's far easier than star horizon, and it would probably be just the way to go for a no comm nav case. You could pick a couple of good sites on the world which, like out there in Arabia and Baja, California, usually always open, why it would be a good way to go.

END OF TAPE

SC - like out there in Arabia and Baja, California usually always open wide. It would be a good way to go.

CAPCOM Roger. We copy that and we're still working on reducing the data from your sightings.

SC Roger, I would say it would be more at least as accurate as star horizons. The stars at this point, the brighter stars like Antares and Spica filled up the entire crater so it was really no problem. The smaller stars Navi and Gienah, they didn't quite fill up the whole crater but it was so easy to put those things in there and make a mark that it's just no task.

CAPCOM Roger, and I understand that Gienah was bright enough against the back ground to be used for marking. Is that correct?

SC Sure was.

CAPCOM Roger.

SC Hello, Houston. We're configuring and ready and standing by for your go on the TV. Over.

CAPCOM 10, this is Houston. Roger, we'll let you know in a minute. 10, this is Houston. We're go for TV now. Over.

SC Okay, we'll be coming your way in about 30 seconds.

CAPCOM Roger.

SC Hello Houston, this is 10. Are you receiving the TV?

CAPCOM Negative, 10. It's not coming through the network yet.

SC Okay. It should be on its way.

CAPCOM Roger. Roger, 10. We're receiving your signal now. It looks like you're showing us the Moon. Roger, 10. We've got you now on the monitor. It's coming in very clearly. Very good picture. Not much noise at all in the loop and the color looks like it's in pretty good shape also. Over. 10, this is Houston. We're getting a good picture now. Over. 10, this is Houston. At the present time we're getting good TV but no down link voice right now. Stand by. This is Houston. At the present time we're getting good TV but no down link voice right now. Stand by.

SC Hello, Houston. How do you read now?

CAPCOM Roger, 10. This is Houston. We're reading you loud and clear on the voice now and a clear TV signal. Over.

SC Okay. The Moon and the Earth are the same relative size to us now. The planet Jupiter is easily visible about 5 diameters from the Moon. We can see stars within 6 diameters of the Moon. Anything within that is washed out. The Mare areas are very easily visible. The Sea of Fertility, the Sea of Tranquillity where the basic landing sites are, Sea of Serenity are the two large Mare areas to the center part on the heighth of your screen as you approach the terminator. I don't know whether you heard me the first time but the Moon is technically to us it's upside down. The North Pole is at the bottom, the South Pole at the top. The East is the most prominent area to the left and the West goes toward the terminator. We're actually pointing in the heavens towards the southern stars.

CAPCOM Houston, roger.

SC The Moon with the naked eye and through our binoculars, we can still see very vividly some of the most important landmarks. We can see Apollo Ridge which we -

END OF TAPE

SC we can still see very vividly one of the most important landmarks, we can see Apollo Ridge which we crossed over and used as a basic IP for our approach for landing site 2, we can see some of the smaller craters that surround our landing site area, are clearly visible to us yet at this time and, I might add, the moon from this position is pointing out to the side. I hope that this picture is giving you the detail, the resolution that we see with the naked eye here.

CC Roger. We are getting very good resolution on the black and white monitor here at the console and we all wish that we could be up there with you looking at it first hand.

SC Well, Jack, you and the folks that are seeing us, watching us leave the moon and we're moving away as you see this picture oh, about 3500 miles per hour. So the picture looks like it is getting smaller slowly. It really is.

CC Thank you, Gene.

SC Let me take you over, Bruce, to show you the earth from the pilot's window

SC At this time you should have earth coming through on your set down in Houston. Over.

CC Roger, we've got it.

SC Houston, Apollo 10. We're looking at the earth out of our left window. We now are approximately 168,000 miles on our return journey to the earth and again relative to the earth we're traveling approximately 3500 miles per hour. At this distance, as Gene has described, the earth and the moon look approximately the same diameter. And as we look at it here, the earth is growing from slightly smaller than a tennis ball where it looks about the size of an orange. As you can see the earth there, actually it's upside down with the white cap as the north pole. As most of you watching your TV sets can't turn upside down very easily, what I am going to do is turn this camera over upside down since it's no trouble for us. See if that will work. Okay, there we go. It's pretty easy for us to go upside down and right side up as far as attitude. It makes very little difference except for maneuvers. So, requiring all you people to stand on your heads to recognize the great state of California up there, I'll just turn this upside down in my head. As we look out there, we can see the terminator and it has definately crossed over the Arizona area and

SC at Baja, California, is barely discernable. You may not be able to see it through the cloud cover. Also, it looks like we have some clouds all the way up to Los Angeles. It may even be smoggy out there today. Toward Seattle, Washington, it looks like cloud cover and the North Pole still has that same complete coverage as Northern Canada over into Russia. The same cloud coverage that we have observed all the way on our trip from Cape Kennedy starting last Sunday. It's a very beautiful, beautiful view as we start our return visit, journey there to the earth and we do have a great attitude for seeing it all the time as we slowly rotate going back home to the earth. We have the earth out one window and the moon out the other and later on the sun. At this time again you can see that the majority of the features are strictly clouds. The blue that you see near the bottom of your screen there is the Amore, South Pacific Ocean, down toward the Galapagos Islands. Now, how is your picture, Houston. Over.

CC That went in beautifully, Tom.

SC Roger.

SC A good relative size for both the earth and the moon. Tom mentioned one and another one might be -- if you took a nickel and held it about 18 inches from your eyeball, that's what the size of the earth, the diameter of the earth and the diameter of the moon appear to us at the present time.

CC Roger. Under this attitude -- tennis ball at arm's length.

SC It's more like a nickel at our place for the average eyeball.

CC Roger.

SC A tennis ball is a good size just looking at it at a distance but in a correlation, it would be to that.

SC Houston, how is the color coming through? Mostly whitish browns to the right of the set and darkish browns towards the California coast, the blues down in the South Pacific Ocean.

CC Roger. The color is coming in here with high fidelity. Sure looks great.

SC Okay, Houston, we're going to take you inside the cockpit for just a couple of minutes. Over.

CC Roger.
CC Okay, we've got the interior scene. Looks like you are looking at the dosimeter or radiometer there.
CC 10, this is Houston. We're not getting very much illumination. Is that John at the nav base?
SC Roger.
CC We can make out the wall of the spacecraft clearly, but as for John's back, it's pretty well shadowed right now.
SC Okay. John is using the optics in a rather unorthodox fashion right at the moment. He appears to be upside down. Just a second I'll see if I can turn him right side up for you. Okay, now we have John right side up, but the spacecraft is upside down. We've got -- still got a problem here. Stand by. I guess we'll just have to accept the spacecraft right side up and John upside down. Here he comes.
CC Oh, say, that's a lot better.
SC That's what the average space navigator looks like after 543 marks.
SC You can observe the patch over one eye to help him adapt.
SC You might think he was some ancient pirate, but actually this is what the modern day space navigator looks like after all the marks that he has been taking. He's done a fantastic job on determining the altitude of the moon's surface, and shooting all the star sightings. Over.
SC You can see John's star charts above his optics right there and above that are some of the codes that are used to operate the computer, the guidance computer on board.
CC Roger.
SC Okay. This is what happens to the optics in zero gravity. Once you start a screw or bolt turning out there, it just keeps right on going forever. There is absolutely no friction associated with operation of moving parts. That's why we have to stick everything together with glue. And since they have been rotating like this I have lost both of them at least once.

END OF TAPE

SC And since they've been rotating like this, I've lost both of them at least once. If you don't think it's hard for a one eyed guy to find something like this when it's running around the cockpit you're not with it.

SC I'll back off and show TP here.

CAPCOM Okay, we've got Tom on the screen now. 10 this is Houston. Tom's voice isn't coming through.

SC As you can see all of us have grown a little bit of a beard in the six days since we left Cape Kennedy. It's been a fantastic voyage out here and it's certainly been a sight and we hope we've been able to share a part of it with you by sending back some pictures.

CAPCOM Roger, they've been some very impressive pictures, too.

SC Again just like we showed you one time before once you're in zero gravity you're adapted to it, it makes no difference whether you're right side up or upside down. And we have been floating all over the cockpit doing chores, making attitude maneuvers, shooting stars, as you can see John there. And we'll say we feel in really great health, in fact we've felt great ever since we climbed aboard the saturn 5 rocket on Sunday, and we're certainly looking forward to a return to the earth and I'd say I think we'll be about as healthy when we return as when we left, over.

CAPCOM Roger.

SC Here you see a pair of our sissors that we open the food with just slowly floating.

SC Okay, we'll go over to the right side of the cockpit, and here's Gene Cernan, right now Gene and John are vying for basic contest as to whos growing the best mustache.

SC For Jack Schmitt's sake, this is how we take targets of opportunity. This has been a, it's been a great trip, so far, we've worked hard but it's been very challenging and very, very rewarding to us, as a team here and I hope to our team down there because we couldn't be where we are if it wasn't for all you guys down there and we really appreciate it.

CAPCOM Thank you John, and I'll pass it on to everyone here in the MOCR and on the other shifts, and it goes without saying that we admire the fine performance that youall have turned in up there.

SC Thank you Bruce, and it's really been great. That pass down to the Lunar surface at 50 thousand feet and the rendezvous and then shooting the top part of Snoopy around the sun and all the land mark tracking and viewing the moon as we saw it and also that climb out this morning

SC as we left the moon. Now that's something you just won't ever forget, and it was so fantastic that we just wanted to share it there with you, over.

CAPCOM Roger.

SC Here you see Gene turning around the flash light that's turned on. The one thing we use in the spacecraft because we do have the problem of zero G is some material called Velcro, and here you'll see Gene putting a light on one of the knobs and John is also putting a pencil there. In fact with just 1 small piece he can hold this whole camera that we have. It's only less than 1 inch square but yet it has the cohesive force to hold the desired object to the surface. Well we're going to end our TV cast now by again just showing you the earth and the moon for one quick glance, and Gene'll take the camera and point it out to the moon.

SC 10 this is Houston, is there anything we could see in the vecinity of the tunnel regarding condensation or anything up there?

SC Yeah, we'll take you up in our tunnell there we've got a lot of gear stored in it.

CAPCOM Looks like Snoopy up there to me.

SC You better believe, that may be a part of Snoopy.

SC Okay you're looking at the edge of the hatch. There's the hatch handle right there. The basic mechanism of the hatch handle mechanism that opens. As you can see it, there's condensation all over there, it's all wet and right up there under the tunnel vent lights around the seal is drops of water condensing out. Can you see that water on the tube? Does it show up on the monitor, and there's condensation on the walls of the tunnel as far down as the top of the hatch surface. But there's very little electrical wiring in the tunnel so we're not really worried about that.

CAPCOM Rog, we can't make out much in the way of water. We can see a little bit of glistening occassionally, that's about the size of it.

SC That's it, that's it. Well there's the vent, there's a thin film of drops all over the hatch and.

CAPCOM Roger, we caught something there.

SC Can you see that?

CAPCOM Roger.

SC That's the same type of film that's all over the hatch and internal walls. Saw a lot on the pressure equilization valve. Look at it right there.

CAPCOM Roger.

SC Bright shiny spots of water.

SC And like I said before this morning, it's 20 degrees cooler in the tunnel, very nice up there. The pressure equilization valve is covered with water, well every piece of equipment in there, particularly the steel pieces around the rim of the seal and pressure equilization valve are covered with a thin film of water drops. You can see some, even on the hatch mechanism. Can you see the alignment arrows ---

CAPCOM Yes that's

SC That we use to align the hatch with.

CAPCOM Rog, the alignment arrow comes through nicely. In fact we could read I guess it was gear box disconnect a few minutes ago.

SC Roger, this hatch weighs about 80 pounds or a little better and in 1 G with, a man has very great difficulty to position this thing and install it and locking it by himself. In zero gravity it's extremely easy to manipulate and operate and it was even easy -

END OF TAPE

SC - field of gravity. It's extremely easy to manipulate and operate and it was even easy to wrestle it by these hoses the other day which we had to take it out and put it in 2 or 3 times while we're checking out the Lunar Module which was attached just above this hatch. But it was a piece of cake to haul it in and out.

CAPCOM Reports like that are good news for our AAP package handling problem.

SC I didn't say it would be easy for AAP, Bruce. I don't believe you can see it but there's some big drops of water about the size of a quarter right where John is putting his hand right now. Right oposite that tunnel light and oposite the end of the hatch handle. It's on the vertical portion of the hatch. Right now John has one of our absorbant towels and is mopping up the water around in that area on the hatch handle.

CAPCOM Roger. Okay, we're getting an outside view again.

SC Roger, as a mater of fact, I was just up in the tunnel feeling of that. That stuff on the outer hatch deal is not water. It's ice.

CAPCOM Roger. Ice.

SC Okay. Gene is going to focus it on the Moon. There, I think he's got it. Over.

CAPCOM Roger.

SC Okay. Like Tom did with the Earth, I've turned the Moon over for you and you're looking at the North Pole at the top, the East is to the right, and the South is to the bottom of your screen. You're looking at the main area that we were interested in as far as landing site operation is concerned, the dark area in the middle, the Mare, Sea of Tranquillity, Sea of Fertility area. As I say with the naked eye this is still very plain and very visible and this is full zoom on the lens. The relative size again at - some 40,000 miles away from the Moon about 45,000 away. It looks like about a - fills up the size of about a nickel at about 18 inches. So with that we'll leave you. Apollo 10 from Tom, John, and Gene saying we're proud to be here, we're proud to represent so many people back there. Its been a pleasure and some hard work. Its been a tremendous challenge and we're looking forward to a complete and successful landing and thank you all again.

CAPCOM Roger, Apollo 10. We're looking forward to having you all back in about 2 days here. We're standing by.

SC Roger, Bruce.

PAO The duration of that transmission was 29 minutes, 5 seconds.

SC Hello Houston, Apollo 10.

CAPCOM Go ahead, 10.

SC Roger, you've heard our report how we feel healthy and very hardy up here. Just want to report on how our boss is doing going through the same simulation with the food on the ground. Over.

CAPCOM Stand by a second. The boss just walked out. If he'd go eat -

SC Jerry walked out. He's probably about half sick. What did you say, Houston?

CAPCOM Roger. We're speculating he went out to eat. He came over here to watch the pass and I guess it was a secondary objective to find out if you all were inserting a meal in the flight plan for today or not.

SC He had some other conveniences to go with that food that we don't have that might make it taste better.

CAPCOM Roger.

PAO The boss is Deke Slayton, Director of Flight Crew Operations. And Deke Slayton was in the viewing room talking to Mrs. John Young at the time the crew asked for the status report from him. I believe he's coming into the Control Center now and will probably talk with the crew very shortly.

SC Hello Houston, Apollo 10. Over.

CAPCOM Go ahead, 10.

SC Roger. For the G&N water Delta V, want to reconfirm that the yaw angle is 060 degrees. Over.

CAPCOM Stand by.

SC You know Houston, if its 060 degrees according to the book on one of these burns you got to realine the platform. That's too close to the middle gimbal. Over.

CAPCOM Roger. We don't want you to have to do that so we'll waive the 060 bit. 10, Houston. Correction there. We will wavie the platform realinement and use yaw 060.

END OF TAPE

CC -Houston. Correction there. We will waive the platform realignment and use yaw 060.
SC Thanks. Was afraid you were going to say that.
CC 10, Houston.
SC Go ahead. Houston.
CC Roger. Understand you wanted a food report from the 1G test sample down here.
SC Roger. We're doing real good up here, Deke and feel real healthy. Wondering how you were surviving down there on it. Over.
CC I'm surviving real well except I'm starving to death, That hydrogen up there must be real filling.
SC It is and I guess that's the only factor that you're missing there boss, because this water real seems to fill you up. Over.
cc Well, we save some weight on food that way.
SC Right. Good reducing diet also I guess our total BTU's per day is probably a little bit less, particularly after that rendezvous day here as far as our movements and everything and you start to use the exergene right away, you build up a heat load 5 psi can't circulate out very well. Over.
CC Rog. That's worth that true.
SC Houston, Apollo 10. Again I mentioned early today, and I guess it got relayed on to you that we're still itching quite a bit from all the insulation that we got in here from the tunnel hatch and at least after that micro biology, the next thing we want to do after we get aboard the carrier is going to be to take a shower, Over.
CC Roger. Got that message Tom and the medics are shaking their heads yes-that sounds like a reasonable plan to them.
SC Okay. Real good. I wish we had a camera going inside, It looks like 3 people scrambling around in a snowstorm here when that vent valve was opened up there. In the same way over in Snoopy. Snoopy was completely covered with the snowstorm but we got it fairly well policed up but it still is settling around all over and so we're taking care of it the best we can but I think that's the best way to get rid of the rashes we have. Over. It's no problem. But we want a shower as soon as we get out.
CC 10, have you -
SC We're cleaning the in-flow valves out at regular intervals,
CC Roger. Have you tried using the wet wash-would it help any?
SC Oh yeah. We've taken about the best type of shower we can and all skin treatment-everything else and we keep cleaning the in-flow valve to the ECS

SC -oh at least 3 or 4 times a day and still just finding fibers-lint from the fiberglass in there but we've got everything under hand but in the meanwhile we just itch a little bit, over.

CC Roger. We copy and we'll work on lining up some showers for you.

SC Okay. Thank you now.

PAO At 153 hours, 10 minutes Apollo 10's distance from the earth is 166,366 nautical miles, velocity 5,036 feet per second.

SC Houston, Apollo 10. You can relay on to Deke that we are going to eat another meal before we go to bed. Over.

CC Roger. He is here listening.

SC Roger. Got that message. I'll start making the line up right now.

SC Don't get too hungry down there.

SC Okay. Real good Deke.

END OF TAPE

SC Houston, this is Apollo 10, over.
CAPCOM Go ahead.
SC Roger, should we in narrow dead band for this water dump? Over.
CAPCOM Stand by.
SC What quads do you want enabled and disabled, today?
CAPCOM Rog, Apollo 10 wide dead band is satisfactory, and your DAP is configured properly, over.
SC Thank you sir, and would you give us a mark at 9 minutes to the maneuver, over.
CAPCOM Stand by.
SC So we can get our clocks synced straight.
CAPCOM Mark.
SC Roger, our clocks are synced and we're counting down to the maneuver, thank you.
CAPCOM Roger.
CAPCOM 10 this is Houston.
SC Go ahead Houston, 10.
CAPCOM Roger, we just got informal word from Princton, that they've got plenty of hot water and soap on board for you.
SC Well thank you very much. Certainly appreciate the effort there.
SC Are you sure they're not water eyed.
CAPCOM They said what ever the situation -
SC Is that salt water, over?
CAPCOM They make an exception for you all.
SC Okay, tell them thanks a lot, over.
CAPCOM Roger.
CAPCOM Apollo 10, this is Houston.
SC Go ahead Houston, 10.
CAPCOM Roger, for John, Barbara was in here in the viewing room watching the show and she enjoyed the production and hearing you very much.
SC I see, thank you.
CAPCOM Roger.
SC Houston, Apollo 10, and we're in the maneuver attieude and counting down, coming up on 3 minutes to the maneuver, over.
PAO And this maneuver is a waste water dump.
SC Mark 1 minute to the maneuver.
CAPCOM Roger, 54 seconds and counting.
SC Roger, would you count us down to the last 5 seconds please, Houston. Make sure we're accurate there when we started, over.
CAPCOM Roger.
CAPCOM Roger stand by 5 4 3 2 1 flush.

SC Roger, and we're on the way. We've got a good ignition, the valves are open, the pressure's good.
SC Man it's raining out there.
SC Houston, 1 minute into maneuver, looks good, over.
CAPCOM Roger.
SC Steering is straight and true. We've got a pilot point 0000015G at the moment.
SC Houston, if Deke's still there, ask him what he thought of that rate of climb this morning after we lit the big afterburner, over.
CAPCOM That was pretty impressive Tom. I've never seen anything quite like that.
SC Neither have I Deke, all 3 of us just sat there in amazement. We just went vertically right out from it. It was really amazing. Like you really pulled back on the pole after the burner was lit and you're up to V max.
CAPCOM I'll have to take that ride with you some day.
SC Sure love to have you.
SC Boy, that engine really runs. I tell you that 3 quarters of a G we're getting felt like about 7 G's. It's hard to get your head off the head rest.

END OF TAPE

SC I think the really frightening thing about it though is the accuracy with which it controls and ends up. Once you get done with a burn, by golly, it dosen't look like we got any work to do much now.

CC Yes, that was fantastic, that cutoff.

SC The guidance systems have really performed for us on this whole mission. In fact, even including the Saturn there.

CC Roger. No question about it.

SC .....one shrimp cocktail for two chicken soup, but you don't have that advantage down there so. you just have to stay with what you've got.

CC Yes, I'm eating Tom's menu so I don't have much variety there.

SC Sorry about that.

CC Actually the flavor is pretty good down here, Tom. I don't know how it affects you up there, but my opinion it's probably the gas is giving you the most problem. Basic food.

SC Right Deke. The food itself tastes real good and those wet packs are good. They made a real great effort and the only thing is I'm sure just the water has filled us up so much and the lack of total activity in here, we just don't... We are staying completely filled up. There's no doubt about that, but we are lagging a little bit behind in the total number of meals consumed. Over

CC Roger. Understand

CC 10, Houston, we show you about 12.0 percent now

SC Roger. I'm reading about 15. Our bias said to cut it off at 10.

CC Yes. We show 10 now.

SC Say again.

cc Roger. We show 9 and one-half percent now. You're overburning.

SC Roger. Manuals cut off, shut off. We got it. Residuals look like about .05 percent plus.

CC Houston. Roger. Out.

SC Houston, this is 10. It looks as if the ISP might have been a little bit low as far as the total burn time was concerned. Over

CC Roger. Actually in defense of the EECOMS shortly before the burn they came up with a revised burn time about 10 plus 58 so looks like they were right about in the middle on it.

SC Roger.

SC Oh, EECOM is doing the chart work now, eh?

CC For a maneuver of this size, yes.

CC 10, Houston, when it's convenient for you, we can take your onboard readouts, crew status and things of this sort, over.

SC Okay. Stand by. It will be a little while yet. We are right in the middle of a this meal, over.

CC Oh, Roger. No hurry. We are going to be here for awhile yet.

SC Okay.

PAO ISP is specific impulse. And Apollo 10 dumped about 33 pounds of waste water in this maneuver.

SC Houston, this is 10. We go to PTC attitude. Heads down tonight, look at the southern constellation for morning realign. Okay?

CC Roger.

SC Houston, this is 10. Over.

CC Go ahead, 10.

SC Roger. It is kinda, mighty cold in this tunnel area. If it really starts to freeze things up, we might want to orient this thing - hatch toward the sun for a little bit one of these days. We'll keep an eye on it. That be all right?

CC Roger. We copy.

END OF TAPE

SC Hello Houston, this is 10.
CAPCOM Go ahead, 10.
SC I got some rad readings for you. In this order 26044, 05044, and 15045. I got data received 36.8. PRYO batts were both 37. RCS 54, 66, 67, and 64.
CAPCOM Roger. Read back -
SC That's all right, Bruce. I've got them written down. I'm sure you got them right. I'm cycling the fans and I'm going into an 02 purge at this time.
CAPCOM Roger. Like to confirm the rad readings. 26044, 05044, 15045. Over.
SC That's it. You got them.
CAPCOM Roger. 10, this is Houston. Over.
SC Go ahead. Over.
CAPCOM Roger. Looking ahead in the Flight Plan, there's nothing very critical immediately following your rest period. If required we could slip the P22 work by a couple of hours and if you want to go ahead and sleep then it's your option. Over. Sunday morning and all that.
SC Okay, I'll leave that - whatever John wants to do - Roger, whatever John wants to do on that. Over. Okay. It doesn't make any difference to me. Whatever is convenient with you all.
CAPCOM Well, we're going to be here one way or the other and your option.
SC Well, I figured you wouldn't turn lose some MOCR. How about we play it if we wake up we do it; if we sleep we don't. Would that be fair?
CAPCOM That's fair.
SC In other words we do it when we wake up. Is that the all right?
CAPCOM Roger.
SC Hey, Bruce. The purge is complete, the canister has been changed. What COMM mode do you want us in tonight, OMNI or high gain? OMNI again?
CAPCOM Okay. We'd like you in OMNI COMM mode. We'd like you to select OMNI Bravo on board with the rest of the COMM configuration per the Flight Plan, that is S-band squelch enable S-band nominal mode voice off and the arch tape off.
SC Okay, fine. I'll stay high gain here for a little bit.
CAPCOM Roger. We'd also like you to terminate the charge on battery A and optics power switch to off.
SC Okay. We got that, thank you.
CAPCOM And then I've got your heater configuration for the CRYO tanks.
SC Stand by, one. Okay Jack. Why don't

SC you take them one at a time and I'll just go through them. Er, Bruce. I'm sorry.

CAPCOM Okay. Oxygen tank number 2 auto. Oxygen tank number 1 off. Hydrogen tank number 1 auto. Hydrogen tank number 2 off.

SC Okay, Bruce. Here's what I got. Hydrogen 1 auto, 2 off. Oxygen 1 off, 2 auto.

CAPCOM Roger. And we had an inquiry from Joe Garino as to what sort of utilization if any you're getting on the inflight exerciser? Over.

SC Roger. We've been using it after TEI and it's working out real good. Would you pass the word on to Joe. We have been - all 3 of us have been using it and it's working out fine and we were rather busy there all the time up before TEI on the whole mission and now we're using it on the way back. Over. It works good.

CAPCOM Roger. You're not having any problems with it are you or anything like that?

SC Negative. It works as prescribed. It's real good. Over.

CAPCOM Very good. I'll pass it on.

PAO That reference was to the Air Force Master Sargeant Joe Garino who's in charge of the astronaut's gym and is the astronaut's physical training coordinator.

SC Houston, this is 10. I'm going OMNI's now, I'll power down the S-band.

CAPCOM Roger.

END OF TAPE

CAPCOM Apollo 10, this is Houston. over.
SC Go ahead Houston, over.
CAPCOM Roger, on the high gain antenna, we'd prefer you to leave the antenna powered up but in a manual mode over night, over.
SC Okav, Bruce.
CAPCOM 10, Houston, when you're through with your computer, we'd like to give you a state vector update, and update the CMP quad and do you have any comments on the EMS check, over?
SC No, we haven't done it yet over.
CAPCOM Roger up.
SC We're 2 and except, over.
CAPCOM Roger.
PAO This is Apollo Control at 154 hours 15 minutes. We're showing Apollo 10's distance as 163,186 nautical miles. Velocity 5,082 feet per second. We're estimating the change of shift news conference for 10:30 pm central daylight time.
CAPCOM Apollo 10, this is Houston. We've completed the state vector and quad delta-t uplink. We've also performed the verb 66 for you, over.
SC Houston, we're in a 20 minute wait period with our C and D jets disabled prior to setting up a 3 tenths of a degree roll way.
CAPCOM Roger, we copy. We're through with the computer. We did a verb 66, state vector update and quad update.
SC Houston, Apollo 10, over.
CAPCOM Apollo 10, this is Houston, reading you loud and clear, over.
SC Houston, this is Apollo 10, over. How do you read.
CAPCOM Apollo 10, Apollo 10, this is Houston, reading you loud and clear, over. Apollo 10, this is Houston, over.
SC Roger, we're not reading you Bruce. We know you're trying but we can't make it out.
CAPCOM Roger, 10 we'll keep trying.
SC Okay read you loud and clear now.
CAPCOM Okay, we're through with the computer. We gave you a state vector update, a clock update and we did the verb 66 for you, over.
SC Thank you. I was just saying we're in our 20 minute hold period prior to setting up a 3 tenths degree rate and go to a Y dead band.
CAPCOM Roger, we copy. We'll stick with you until you get set up in PDC and then I guess we'll bid you a good night.

APOLLO 10 MISSION COMMENTARY, 5/24/69, CDT 21:54, GET 154:15 520/2

CAPCOM 10, Houston on our displays down here we show your race nulled out sufficiently, proceed with setting up the desired roll rate, over.

END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/24/69 CDT 2214 GET 15425 521/1

SC Houston, this is 10. Over.
CC Go ahead 10.
SC Roger. The MS test is completed, worked just like it supposed to.
CC Roger.
CC And 10, this is Houston. If you all want to sign off now we have nothing further for you. I guess we'll expect to hear from you, in the same way, I guess down voice, backup as in the past.
SC Roger. We'll be talking to you.
CC Roger. Out. Good night.
SC Good night.
PAO This is Apollo Control. You heard CAPCOM Bruce McCandless bid the crew goodnight. At the present time, Apollo 10 is 162,122 nautical miles from earth, traveling at a speed of 5,098 feet per second. This rest period is scheduled to last for 9 hours until about 163 hours, ground elapsed time. During the night, we'll give you periodic status reports on the condition of the spacecraft and the position and we'll be continuing to monitor systems and also the biomedical information on the crew. At 154 hours, 38 minutes this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/24/69, GET 155:24, CDT 2312, 522/1

PAO This is Apollo Control 155 hours 24 minutes. Flight Surgeion reports that the crew apparently are still awake. The last time we heard from them was about 50 minutes ago. And CAPCOM Bruce McCandless bid the crew good night. We have biomedical data on Tom Stafford and Gene Cernan. John Young is apparently in the sleep station under the right couch. We don't have biomedical data on him, but the information we're getting from telemetry from Stafford and Cernan indicates that they have not gone to sleep at this time. Apollo 10 is now 159 739 nautical miles from earth. That's more than 51 000 miles from the moon at this point, and traveling at a speed of 5135 feet per second. At 155 hours 25 minutes, this is Mission Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5-25-69, GET 156:22, CDT 00:11 523/1

PAO This is Apollo Control at 156 hours, 22 minutes. We continuing to monitor both spacecraft systems and crew biomedical data. The flight surgeon advises us that the crew apparently is still up and about in the spacecraft. We have biomedical data on two crewmen and indicates that from their heart and respiration rates that - that they are not sleeping at this time. At the present time, Apollo 10 is 156 787 nautical miles from earth, and the speed continuing to increase slowly up now at 5 183 feet per second. At 156 hours, 23 minutes, this is Mission Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, GET 157:28, CDT 0117, 524/1

PAO This is Apollo Control at 157 hours 28 minutes. It appears that the crew is sleeping at this time. The one crewman on whom we have biomedical data, John Young, has been asleep now for about 40 or 45 minutes. All spacecraft systems continue to look good at this time. Apollo 10 is presently 153 450 nautical miles from earth, and traveling at a speed of 5238 feet per second. At 157 hours 29 minutes, this is Mission Control.

END OF TAPE

PAO This is Apollo Control at 158 hours 24 minutes. Apollo 10 now 150,581 nautical miles from earth. And the spacecraft velocity 5,287 feet per second. We have had no conversation with the crew throughout this shift. After bidding - bidding them goodnight, at 154 hours 35 minutes, biomedical data indicated that John Young began to sleep about an hour and a half ago. And it's been relatively quiet here in Mission Control. At 158 hours 25 minutes, this is Mission Control.

END OF TAPE

PAO This is Apollo Control at 159 hours 35 minutes. At the present time Apollo 10 is 146,937 nautical miles from earth and traveling at a speed of 5353 feet per second. The crew continuing to sleep soundly, at least according to the telemetry we're getting on one of the crewmen, John Young. The Flight Surgeon reports his heart rate in the low 50's and he seems to be sleeping soundly. We bid the crew good-night at 154 hours 35 minutes, which would be just about 5 hours ago. It appeared that they began going to sleep about 2 hours after the rest period began. The spacecraft cabin temperature has been running around 71 degrees most of the evening. And the fuel cell performance and all other systems performance has been nominal. The spacecraft weight at the present time is 25,240 pounds and that's about 10,000 pounds or so less than Apollo 10 weighed prior to the trans-earth injection maneuver. Most of the weight difference there accounted for in the SPS burn that took the spacecraft out of lunar orbit. At 159 hours 36 minutes, this is Mission Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5-25-69, GET 160:41, CDT 04:30 527/1

PAO This is Apollo Control at 160 hours, 41 minutes. Apollo 10 now 144 425 nautical miles from earth, and the velocity up now to 5 419 feet per second. There's been no change in the status of spacecraft or crew since our last report. The crew continues to sleep. We don't plan to awaken them. Tomorrow's or rather today's activity is rather light, and the plan is to let the crew sleep as long as they wish. The spacecraft has been maintaining very good passive thermal control rotating at one revolution rather 3 revolutions per hour, and we've had no thruster firings to correct dispersions in the attitude since establishing the passive thermal control. This is Apollo Control at 160 hours, 42 minutes.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, GET 161:44 CDT 0533

PAO This is Apollo Control at 161 hours 44 minutes. Apollo 10 now 140,097 nautical miles from earth, and the spacecraft velocity 5484 feet per second. The crew well into their 9 hour rest period at this point. Normally the rest period would end at 163 hours, a little over an hour and 15 minutes from now. However, because of tomorrow's relatively light schedule, as far as the flight plan is concerned, it is planned to let the crew sleep as long as they wish. During the evening Flight Dynamics Officer has been working up some preliminary figures for midcourse correction number 6, which will probably be the only midcourse required prior to reentry. That's scheduled to occur - the midcourse correction scheduled to occur at 176 hours 50 minutes ground elapsed time. And the preliminary data for that burn is as follows: it would be a 1.2 foot per second maneuver using two reaction control system jets. The burn duration will be about 5 seconds, and it would put the spacecraft on target for splash at 164 degrees 41 minutes west longitude and 15 degrees 4 minutes south latitude. And the splash time would be very close to the nominal listed in the flight plan at 192 hours 3 or 4 minutes. At 161 hours 46 minutes, this is Mission Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, GET 162:42, CDT 0631, 5:29/1

PAO This is Apollo Control at 162 hours 42 minutes. The Apollo 10 crew now about 8 hours into their planned 9 hour sleep period. Apollo 10 at this time is 136 955 nautical miles from earth, and traveling at a speed of 5547 feet per second. Here in Mission Control we are having our change of shift. Flight Director Pete Frank is relieving Flight Director Milton Windler. CAPCOM for this shift is Jack Lousma. The Apollo 10 crew, according to biomedical telemetry information that we had on John Young, apparently did not get to sleep until about an hour and a half after beginning the sleep period. Because of the light schedule of activities on today's flight plan, a decision has been made to let the crew determine their own wake-up time. We don't plan to put in a call to the crew to wake them up. At 162 hours 44 minutes, this is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control. Apparently, the crew of Apollo 10 is awake. They are now beaming music back down to earth. Let's listen in.

SC ("Come Fly with Me" by Frank Sinatra.) Good morning, good morning. This is Tom, John, and Gene. KAT10 broadcasting again from approximately 140,000 miles out into the universe. It's a beautiful day out here and it appears that it might be a beautiful day down in mother earth country. For those of you who are not just ready for work or are just getting up, get up lazy bones, it's time you got up. Big day ahead. And the thought for today is "remember, last National Secretary's Week was last month.

CAPCOM Good morning, Apollo 10. You managed to wake everybody up early down here and thank you for your brief program and we'll be giving your advice due some consideration down here. And we've got a little bit of music for you. (Singing Zippity-do-da)

SC (Garbled)

SC (Clapping)

CAPCOM Roger, thank you for the applause. And watch out for migratory bird season.

SC That was a couple of seals up here.

CAPCOM You might have recognized Deke Slayton as solo on that song we sent up to you, 10.

SC Rog If he's ... he's zippity-do-da-ed all right.

CC He's not in here yet and I'm going home; I'll see you guys later.

SC Hey Joe, we haven't even had a chance to say hello to you.

CC I know that; I hung around to wait till you wake up; was an exciting night last night; I'm glad we sent it.

SC We just figured it out; we were rotatating from 3 time an hour, and its just 3 days and 3 nights every hour now - what day is it? That makes it about the middle of August I think.

SC Hello Houston, Apollo 10.

CC Morning Tom.

SC Roger. Is Joe still there; over.

CC Rog - he's still here.

SC Yeah Joe - how about doing me a favor, will you ole buddy?

CC You name it.

SC Okay - we're kinda out of town for church today - and the minister, you know - Reverend Barrymore wanted my - you know - reflections or something that might be appropriate to read in the service since I won't be around there; have you got a pencil, I just had copied down a couple of things that I thought might be appropriate; over.

CC Roger; go ahead.

SC Roger; ~~from~~ Psalm 8, Psalm 122, Psalm 128, and Isaiah 24; over.

CC Okay; read back. Psalm 8, 122, 148 and Isaiah 24.

SC Alright - just tell the congregation hello for me, and that I thought that those might be appropriate since he was asking for something that, you know, to go along with the mission. Over.

CC Roger that Tom; that is very appropriate; I'll see that the word gets around -

CC Joe knows them all right off the top of his head.

SC (laughter) Right. Hey Jack, we're sorry to keep you off the golf course this morning.

CC I gave up the game a long time ago.

SC We'll have to try it again after we get back.

CC That's a good idea; like to take it up.

END OF TAPE

SC Hey Jack, we're sorry to keep you off the golf course this morning.

CC I gave up the game a long time ago.

SC We'll have to try it again after we get back.

CC That's a good idea, I'd like to take it up.

CC Hey Gene, I've got your astro-cast here, we're trying to whip up some news but I think it will be awhile. Your's is -

SC Ok. Go ahead.

CC This Sunday may find you in some quandry over home conditions, there should be some help available. Don't make smart remarks about Marines.

SC Who wrote that, did the great philosopher write that?

CC The unemployed philosopher, he's got the day off today.

SC I'm still waiting for that special song.

CC And here's John's. His money has to be spent today on institutions and the use of them for various purposes. Take the time to check everything out before doing anything drastic. Finding the why in a situation may be more important than any other determination.

SC They got me there alright.

CC Yeah. And Tom, since your relatives and neighbors expect to see you this Sunday, do the emitities gratefully. Make the rounds, there are gifts for you here and there. Then seek solitude. Reprimand all those in your command who make smart remarks about Marines. Over.

SC (Laughter). Tremendous, Jack, just tremendous.

SC Hey, Jack, don't you call us -

END OF TAPE

CAPCOM ... ... altitude. Reprimand all those in your command who make smart remarks about Marines. Over.

SC (Laughter). Terrific, Jack. That's just terrific.

SC Hey, Jack, don't you call us, we'll call you.

SC Are you just coming on duty, or are you leaving?

CAPCOM Just coming on.

SC Oh my golly.

CAPCOM I've been out guarding the gate all night, of course.

PAO This is Apollo Control. The crew of Apollo 10 apparently at this time having breakfast. They were to have slept a little bit longer, although they did wake up about the premission flight plan wake up time. Here at Mission Control it had been decided to let them sleep until they called back here. Their call was in the form of music being piped down from the spacecraft from a small Cazette tape recorder. Lunar Module pilot Gene Cernan followed up with a disc jockey bit, and there was a certain amount of repartee between the ground and the spacecraft communicator here in Mission Control, oncoming orange team CAPCOM Jack Lousa and outgoing maroon team CAPCOM Joe Engle. Spacecraft commander Tom Stafford suggested several biblical readings for today's services at Seabrook Methodist Church to CAPCOM Joe Engle, both of whom go to the same church. Since Tom would not be able to attend the services today himself he suggested readings from -

END OF TAPE

PAO Spacecraft Commander Tom Stafford suggested several Biblical readings for today's services at Seabrook Methodist Church to CAPCOM Joe Engle, both of whom go to the same church. Since Tom would not be able to attend the services himself he suggested readings from Psalms 8, 122, 148, and Isaiah 24. We'll continue to monitor air-ground transmissions as the crew completes breakfast and get into the crew status report, flight plan updates, and the day's activities which are primarily midcourse navigation using a combination of star and earth horizon, in which the included angle between the near or far earth horizon and the desired navigation star is massaged by the onboard computer to provide position and velocity information. Standing by on live air-ground for resumption of communication with Apollo 10.

SC Hello, Houston, this is Charlie Brown.

CAPCOM Go ahead, Charlie.

SC You're Snoopy. Jack, I'd like to hold off on this RCS redundant component check until we get fuel cell number 1 back on the line which I assume won't be too long judging from the temperature. The main reason is I'd just rather do that when I turn on the secondary pump.

CAPCOM Okay, Geno, that will work out good.

SC Okay, thank you, Jack.

PAO This is Apollo Control. Circuit is getting quite noisy as the spacecraft rotates around where the omni -

END OF TAPE

PAO This is Apollo Control. Circuit is getting quite noisy as the spacecraft rotates around where the omni antennas tend to break lock. Present position of Apollo 10, 134,041 nautical miles above earth, out from earth. Velocity steadily increasing, now 5,609 feet per second. Here in Mission Control, the maneuver pad for midcourse number 6 and state vector updates and all the other information that must be passed up to the crew today are being generated. The crew apparently still in the midst of breakfast. We will now rejoin the static from the air-to-ground circuit.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, GET 163:45, CDT 0734
535/1

PAO This is Apollo Control still standing by for resumption of communications with Apollo 10 as they settle down for the day's business. We'll continue to monitor the circuit as hopefully the conversation will resume. Here it goes.

CAPCOM The Orange Bugle here when you're ready to listen.

SC Send it up, Jack.

CAPCOM Okay. Hilo, Hawaii: Kilauea Volcano on the Island of Hawaii erupted shortly before dawn Saturday spewing lava 200 feet into the air. Dr. Howard Power, scientist in charge of the U.S. Geological Survey's Volcano Observatory said it was the 14th eruption of Kilauea since 1960. The last one occurred February 22 and lasted for 55 hours. Aboard the yacht Duchess the first men scheduled to land on the moon practiced earth splashdown procedures in the Gulf of Mexico Saturday and sprayed each other with disinfectant that will be used to guard against any unexpected moonbug contamination. Apollo 11 astronauts Neil Armstrong, Mike Collins, and Buzz Aldrin were all dressed in plastic coated biological isolation garments designed to keep any hostile organism they might bring back from getting loose in the earth's environment. The exercise began when a dummy moonship with the pilots aboard was dumped into the calm Gulf 3 miles south of Galveston, Texas from the space agency's vessel retriever. The command module was turned upside down and then flipped over using it's own righting systems. 4 swimmers attached a yellow flotation collar to the capsule and one of them donned an isolation garment while the other swimmers moved away in a raft. Miami Beach: Blode, hazel eyed Miss Virginia, 19 year old Wendy Datson Saturday night was selected 1969 Miss U.S.A. over 4 other finalists in the annual pagent. Daughter of a Danville, Virginia physician, Miss Datson is a former cheer leader who is now attending Stratford College. She said she entered the contest because a schoolmate said she might have a good possibility of winning. Pago Pago, American Samoa: The governor of this South Pacific American territory said he promised a Polynesian welcome of singing of dancing for the Apollo 10 astronauts, but nothing risque. The celebration may be limited to 10 minutes and will include a typical Samoan dance by several of our beautiful girls, said Governor Owen Aspinall. The dancers will wear the Samoan full dancing costume, a colorful 2 piece outfit consisting of a wrap-around skirt and blouse. There will be nothing risque of course, said the governor. The dancers are well within the propriety of their Samoan custom. So while they're dancing you can stand there itching. Moscow: A Soviet scientist said Saturday that Russia will depend on machines instead of man to explore the gloomiest corner of the solar system.

CAPCOM He indicated the Soviets planned a spectacular series of unmanned space shots within the next decade culminating in 1977 with a 9 year instrument Odyssey to 4 different planets. "Such a trip", he said "could not be repeated in this century." Hagerstown, Maryland: Even in these days of affluence in society it may sound a bit hedonistic to own your own railroad car, but Rueben Darby has made a business of converting old railroad cars into private palace cars. The price if $50,000 and up. Wonder what they do with old command modules? London: The achievement of Apollo 10 is a superb combination of human courage and technical skills Sir Bernard Lovell, director of Britian's Jodrell Bank Observatory and a leading space expert said today in an article for the Times. Khatmandu, Nepal: The five member Swiss mountaineering group has conquered 22 686 foot Mt. ... in western Nepal. The leader of the expedition said today, named George Hartman, that his team scaled the mountain twice in one day. In the National League: Chicago 7 San Diego 5; Houston over the Mets 5 to 1; and the Phillies beat the Braves 8 to 3; I've got the rest of the scores here if you want them. Oklahoma still doesn't have a baseball team.

SC Hello Houston, this is 10.

CAPCOM Go ahead.

SC Jack, I don't know whether we lost you or not, but the last we heard was the mountain climbing.

CAPCOM Okay, you lost me. Lets just take up the baseball scores. That's all I had left. Chicago 7 San Diego 5; Houston 5 Mets 1; Phillies 8 Braves 3, and still no baseball team in Oklahoma.

SC Roger.

SC Looks like the Cubs and the Astros are the 1 hottest ball clubs in the league this week.

CAPCOM Yes, the Cubs are quite a ways out in front and Houston really needs it.

SC Yes, I've got 2 loyalties there and so I'm for both teams. Hey listen, our heartiest and sincere personal congratulations to Miss Virginia.

CAPCOM Roger, we copy, sincere congratulations to 19 year old Miss Virginia.

SC Thank you for the news, Jack. How's the weather back there these days?

CAPCOM Well, the weather around Houston has been real nice. It's getting rather warm, up to about 90 each day, and -

END OF TAPE

SC Thank you for the news, Jack. How's the weather back there these days?

CAPCOM Well, the weather around Houston has been real nice. It's getting rather warm, up to about 90 each day and the ole humidity is starting to climb too.

SC We meant the recovery area.

CAPCOM I have a request in for weather and we'll get that to you pretty soon.

SC Okay. And, Jack, you might pass on to the Governor down there in Samoa that we're certainly looking forward to the reception and seeing his beautiful island, over.

CAPCOM Roger, Tom, we'll pass that on.

CAPCOM Okay, 10, Houston. Here's the weather forecast for the landing area. Essentially no change from the weather I gave you yesterday. 1800 scattered, 10,000 broken, high broken 10 miles. Wind 120 at 15 knots; wave height is 5 feet, 81 degrees; widely scattered showers, over.

SC Jack, we missed the first part of it.

CAPCOM Okay, the weather conditions are no different than forecast yesterday. 1800 scattered, 10,000 broken, high broken in 10, winds 120 at 15, wave height 5 feet, 81 degrees, widely scattered showers, over.

SC Okay, thank you.

SC Houston, this is 10.

CAPCOM Go ahead.

SC As we played "Fly Me To The Moon" about 4 days ago on our way out to remind you of help we needed, we'd like to play you one more song in its entirety to remind you of our determination.

CAPCOM Okay, go ahead, we're listening.

("Going Back To Houston" by Dean Martin played here.)

CAPCOM Roger, 10, we can see you're really determined to get here. As a matter of fact, if you want we probably could arrange it so as you didn't have to stop at Samoa on the way, over.

SC Jack, after careful consideration here we voted that you should go back and guard the gate.

END OF TAPE

PAO This is Apollo Control. A little more disk jockey type music out of the spacecraft, Dean Martin's "Going Back to Houston." Continuing to monitor air to ground here for resumption of the day's activities. Here we go.

CAPCOM - we would kind of like to go to high gain antenna, and during PTC mode, if you would go to reacq and narrow beam, your settings are pitch +30 and yaw 270. Over.

SC Okay, how soon do you expect us to pick that up, Jack? I'm in narrow and reacq right now and I will go to high gain on my switches there. And you can switch us whenever you think we will get acq.

CAPCOM Roger and during the times that you are not in PTC today, go high gain to manual and select omni B, over.

SC Omni B, roger.

PAO This is Apollo Control. Circuit noise building up as the spacecraft rotates around to here it's breaking lock with the omni antenna. We will continue to monitor for resumption of conversation.

END OF TAPE

SC Hello Houston, this is 10.
CC Howdy 10; reading you loud and clear now.
SC Yeah that - let me get that antenna set up for you and then I'll put it in react because it doesn't want to pick it up and lock onto you and react you; let me know when you want to make that switch over to high gain and I'll set it up for you and then put it in react and then we'll let it run; otherwise, I don't think it's going yo lock on for us. And I've got some rad readings for you if you'd like them.
CC Okay, let's go with the rad readings.
SC Okay - 2604605046 and 15047.
CC Roger.
SC Got your report from yesterday; proper reports from yesterday; the Commander and the (static)
CC Roger; we copy.
CC And 10, Houston; you can select high gain now; over.
SC Okay, will do.

END OF TAPE

CAPCOM Apollo 10, Houston. How do you read now?

SC Okay, Jack, I'll give it to you now. It's in reacq at plus 30 and 270.

CAPCOM Okay, good. Okay, 10, on the high gain antenna then. You can leave her hands off and we'll take her from here, over.

SC It's all yours. I didn't mean to hit command reset but since there's nothing critical I'd play with it for awhile and get it set up because the first time around it didn't want to acquire. It was pinging all over the place when we were trying to come back around, so I thought I'd get you a good lock on. So we're at reacq narrow plus 30 270 and you've got them.

CAPCOM Okay, Geno, we weren't quite in the high gain attitude there and we weren't able to get our command in.

SC Okey doke. Jack, what do you think about putting fuel cell 1 on and get on with that redundant component check and start the battery charge and what have you?

CAPCOM Okay, Gene. Let's crank up fuel cell 1 and put it on both buses and give it a chance to warm up and in about 1 hour we'll go with the redundant component check, over.

SC Okay. Is it okay then to go ahead and put - start charging battery B at this time after I get it on?

CAPCOM Affirmative, Geno. You can start your battery recharge.

SC Thank you.

CAPCOM And when you're ready to copy I've got consumables and flight plan, over.

SC Okay, Jack, go ahead on the consumables, over.

CAPCOM Okay, on the comsumables, Tom, at 162 hours we had total RCS 55 percent, A 44605658, H2 and O2 is 24.7 and 315. Your RCS is 18 percent above the flight plan.

SC Okay, I got all those, thank you.

CAPCOM And, Apollo 10, we've got you out there at about 130,000 miles at about 5700 feet per second, and we've got a nominal entry angle of minus 6.52.

SC Roger, you mean that last maneuver we made with the - using the G&N and the water put us in the quarter there? Over.

CAPCOM Roger.

SC Fantastic.

CAPCOM Roger, we'll -

SC Well, from that I take it we don't - Pardon me. What I take from that is we don't make any more midcourse maneuvers.

CAPCOM Okay, 10, the numbers that I gave you were with a midcourse, would be minus 6.52. So we're going to do a midcourse 6, over.

SC Roger, understand midcourse 6, thank you.

CAPCOM And in our present status without a midcourse we'd be up around 6.95, so we're right in there anyway pretty close, but we ought to sweeten it up a little.

SC Oh, roger, we agree, over.

CAPCOM And Apollo 10, Houston. We have a state vector for you when we can get your computer and we also have a minor flight plan update, over.

SC Roger, computer is in ACCEPT at this time and go ahead.

CAPCOM Roger, flight plan update. Here's a note first. The P23's scheduled for today are designed to determine the minimum sun angle; however, you might have a little difficulty with one or more of these sets due to the sun angle. However, the attempt should be made anyway on schedule. At 168 hours consideration is being given to an S-Band reflectivity test and the test procedures are on 3-19A of the flight plan. Okay, Apollo 10, Apollo 10, Houston. Understand we didn't key so I'll repeat.

SC Roger, we're trying to follow.

CAPCOM Roger, how much did you copy, Tom?

SC Nothing.

CAPCOM Okay, the site wasn't keying -

SC We didn't copy at all.

CAPCOM Roger, the site wasn't keying and they're keying for us now. So the P23's that are scheduled for today are designed to determine the minimum sun angle. You may have a little difficulty with one or more of these tests because of the sun angle; however, the attempt should be made anyway on schedule. At 168 hours we're giving consideration to making an S-Band reflectivity test and these test procedures are on page 3-19A of the flight plan. We'll come through with more word on this later. At 17030 delete the ECS redundant component check. This check is duplicated in about an hour anyway so we'll delete that one at 170 hours. Over.

END OF TAPE

CAPCOM - in about an hour anyway, so we have to leave that one on at 170 hours, over.

SC Roger. We have the ECS redundant component check completed.

SC Houston, with that state vector you just gave us, would it be okay to run through P37 to see what that midcourse is going to be? Just to see what this thing thinks it's going to be?

CAPCOM Stand by one, John.

CAPCOM Okay, Apollo 10, Houston. Uplink complete, you can go to block and we'd like to see you do some P37's and the time you can use is 17650 and we would like to follow you through on it, over.

CAPCOM Apollo 10, Houston, did you copy?

SC Roger. We're going to run through P37 right now.

SC Are you guys copying all this okay, Jack?

CAPCOM That is affirmative, John, we've got it.

SC ... trans verb 14 hours 58 minutes and 44.78 seconds.

CAPCOM Roger, we see it.

SC Wow.

SC Houston, 10.

CAPCOM Go ahead.

SC Jack, can you get me a recommended exposure setting to use the interior 16-mm film outside at distant earth, please?

CAPCOM Stand by one.

SC Just want to check it against my spotmeter here.

CAPCOM Roger.

SC Gee whiz. Just two passes.

SC That's great.

END OF TAPE

CC Apollo 10, Houston. We noticed you got delta V - correction, inertial velocity 36314; we are different by 1 foot per second, and you got minus 6.5; we got minus 6.52; over.

SC Well I don't know why; you guys sent me the data. I wouldn't argue over 200th of a degree anyway; nobody knows it that well.

CC Roger, we were just trying to tell you how well off you are.

SC Roger. Never doubt. What did you guys get for Delta V?

CC Well we're looking a 1.2 on the Delta V.

SC Outstanding.

PAO This is Apollo Control. Spacecraft now 129 835 nautical miles from earth, traveling at a velocity of 5 701 foot per second. We'll be passing up to the crew the maneuver pad, all the numbers needed for preparing to do the midcourse correction burn number 6 which will be in the neighborhood of 1.2 feet per second. Also the entry pad which will have all the numbers needed for the ranging and spacecraft steering during entry, as well as times of entry events such as drogue chute deplay, main parachute deploy and splashdown and so on. These numbers will be refined after midcourse number 6, and additional tracking is acquired and processed here on earth. We'll continue to stand by on live air-to-ground as the conversation continues with Apollo 10.

CC Apollo 10 Houston. We have some dope on the exposure setting for you. Turns out the whole film of course has to be processed the same way - so if you are going to use a whole magazine for exterior shots, that is a whole magazine, your exposure settings should be f/11 at 1/250. If you want to use part of the film for - part of the magazine for interior shots, then do your exterior shots at f/22 and 1/500; over.

SC Jack, I missed part of that; I understand exterior shots with the 69 - and 60m interior is f/22 with 5100th that's all I heard.

SC Houston, this is 10.

CC Okay, 10, how do you read me now, over.

SC Okay, why don't you repeat that for us Jack, would you?

CC Okay - since the whole film has got to be processed in one batch, if you want to use the whole magazine, for exterior shots, your setting should be f/11, at 1/250. But if you want to use part of the magazine for interior, then do the exterior at f/22 and 1/500, so that all the pictures will come out all right when they are processed; over.

SC Okay, I got that; thank you very much Jack.

END OF TAPE

CAPCOM Apollo 10, Houston. It turns out that it's quite important that we do this P23 midcourse navigation drill pretty much on time to get the appropriate data and solutions and so would like to recommend that we get on with it pretty soon, over.

SC Roger, we're going on with it right now.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0857, GET 16508 543/1

(DEAD AIR)

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0907, GET 16518 544/1

(DEAD AIR)

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0917, GET 16528 545/1

PAO This is Apollo Control. We've had no recent communications with the spacecraft and while the entry and midcourse correction number 6 information is being compiled to pass up to the crew, we'll take this circuit down for the time being and bring it back up when conversation does resume. And at 165 hours, 29 minutes Ground Elapsed Time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 165 hours, 39 minutes ground elapsed time; we have an accumulation of tapes and we'll join the live conversation as the tape is played out.

SC Houston, we are wondering from that first look, if the W matrix makers is okay.

CC Stand by 1; we'll have somebody look at it.

CC Apollo 10, Houston, turns out the only way we can look at the W matrix is to have you a call up a verb 67; over.

SC Roger - well according to the instructions we're not supposed to change it from what it was the other day, but I was wondering if when you uplink the state vector that doesn't reshuffle it some way or another.

CC If you call up a verb 67 all that does is let you look at the W matrix - doesn't do anything to it, and when we send you a state vector, it would just reinitialize it; over.

SC Okay.

CC And John, when your buddies wake up up there, I've got a maneuver pad and an entry pad anytime you are ready for it.

SC Roger; go. We're not quite ready. ... only with you down there can we feel so secure Jack, and we're ready to copy, Babe.

CC Okay - I've got a midcourse 6 maneuver pad. Midcourse 6 - RCS G&N, 25240 176 49 5728 plus 00012, plus all balls, plus all balls, 088, 354 351 NA. H sub P is 00212 00012 005 00012 40 2744 340 033 Delta 003, Lima 12, the rest is NA. Your set stars are Deneb, 43, Vega, 36.

SC I think I got it all Jack. Its midcourse 6 - its an RCS G&N burn. 25240 then we'll go to noun 33, 176 49 5728 plus 00012, plus all balls, plus all balls, roll is 088, 354, and 351. Perigee is plus 00212, 00012 005 00012 40 2744 340 033 Delta 003 and Lima 12. Deneb 43 and Vega 36 - 148 013 and 018, two quads, Bravo and Delta.

CC That's right Gene, and I've got an entry pad when you're ready.

SC Okay Jack.

CC Okay, entry pad Mid Pacific. 000 153 000 191 31 55 268 minus 1507 minus 164 68 067 36315 652 12040 36395 191 48 55 00 28 - DL match, DL manner NA, noun 59 is all NA, 400 02 08 00 18 0329.

Sc Jack - stand by. After noun 69, where are you picking up please?

CC After noun 69, we are picking up at B circular , D zero.

SC Okay - hit me with D zero again, would you please? 400 - but pick it up again.

CC D zero is 400 02 08 0018 03 29 0818 40 2611 -

CC 2611 347 033 Dog 080, Lima 22 lift vector is UP; your gimbal angles on entry pad are based on option 2 at 191 48 55 which is at 400 000 feet. Your GDC aline set stars for the entry alinement - are Deneb, 43, Vega 36. Roll is 067, pitch is 174 yaw is 343; over.

SC Okay - I've got Mid Pac - 000 153 and 000 191 3155 268 minus 1507 minus 164 68 067 36315 652, 12040 36395 191 48 55 00 28 00 28 picking up at D zero, 400 0208 0018 0329, 0818 40 2611 347 033 Delta, 080, Lima 22, lift vectors UP, roll and pitch and yaw angles are based upon option 2 and that's at 191 48 55 and I blieve -

END OF TAPE

SC Based upon option 2 and that's at 191 48 55, and I believe that's at 400 K. Our set stars are Deneb 43 and Vega 36, 067174 and 343.

CAPCOM Roger, you got it all.

CAPCOM and Geno when you get around to it for CG purposes we're going to have to take a look at the LCL recovery checklist on activation serial number 1003, and with those items of significance weighting, why if you'd just read the number and their stowage location that will take care of it. Over.

SC Okay, Jack, we'll get that to you.

CAPCOM Gene, this is Houston. If you're going to stay in this attitude for a few minutes more it would be a good idea to start the redundant component check now. Over.

SC Okay, fine.

SC Jack, I'm also starting a fuel cell purge at this time.

CAPCOM Roger, we copy.

CAPCOM Apollo 10, Houston.

CAPCOM 10, Roger, go ahead with the fuel cell purge.

SC Houston, Apollo 10. Do you want us to remain in approximately this attitude for the next 2 hours and where we're going to be picking up next navigation stars horizon marks. Over.

CAPCOM Stand by one, Tom.

CAPCOM Apollo 10, Houston, we suggest going back to PTC after the redunant component check is completed, and we'd like to have some words from John as to sun interference in his P23. Over.

Sc He'll talk to you in a minute. Over.

SC Hello Houston, Apollo 10.

CAPCOM Go ahead 10.

SC Say, Jack, we're starting to get pretty cold in the cabin since we've got to blank out all the windows here for John to do that tracking and we'd like to get some sun in this cockpit, over, so how about delaying here for a few minutes to put the sun in one of the windows. Over.

CAPCOM Sure, this whole attitude business is at your convenience, Tom.

SC Houston, on the P23 I don't think the problem was interference with the sun. The problem was to try to determine how close to the terminater you could mark stars, wasn't it?

SC So you can relax some those star selection sightings for no comp.

CAPCOM Stand by, John.

SC I think that's the purpose of it,

SC was to be able to prove the star selection sighting schedules for the no comp cases, and I didn't have any problem tracking those close to the terminater. (garbled)

CAPCOM Roger, we copy. Yes, John, you're right.

CAPCOM Apollo 10, Houston, secondary coolant loop check looks good here and you can go to reset on your secondary evap. Over.

END OF TAPE

CAPCOM Apollo 10, Houston. Your secondary evap back pressure looks okay now and you can turn your secondary pump off if it will help you out in that cabin temperature somewhat.

END OF TAPE

PAO This is Apollo Control. While waiting for resumption of air-to-ground, to review the two maneuver pads, or actually, one maneuver pad and the entry update, the midcourse correction number 6 is now planned for 176 hours, 49 minutes, 57.28 seconds Ground Elapsed Time. It'll be a 1.2-foot per second burn using the RCS thrusters. This will adjust the entry corridor to the proper angle. And then following that the entry information was passed to the crew, which would bring a splash point at 15 degrees, .07 minutes south, or actually 15.07 degrees south latitude by 164.68 west longitude. Maximum g's to be pulled during an entry of this type, 6.7. Velocity at entry interface, 36,315 feet per second. Flight path angle at entry, 400,000 feet, 6.52 degrees. Range to go to touchdown point after entry, 1204 nautical miles. Let's rejoin the conversation.

CAPCOM Turn your pump off. This will help you out in that cabin temperature somewhat.

SC Thank you, Jack. We've got it cleaned up now.

END OF TAPE

PAO This is Apollo Control. Apollo 10 now 125,313 nautical miles from earth, approaching at 5,805 feet per second at the present time. It's been rather quiet the last several minutes. No exchanges of conversation between the ground and the spacecraft, we will now take the circuit down and rejoin any conversation as it develops. At 166 hours 13 minutes, this is Apollo Control.

END OF TAPE

CC Apollo 10 Houston, we got some flight plan information for you.
SC Stand by a minute Houston, over.
CC Roger.

END OF TAPE

PAO This is Apollo Control. Let's join the conversation in progress.

CAPCOM Hey, 10, before we go ahead with the flight plan, we'd like you to turn on your H2 purge line heaters now and start an H2 purge on fuel cell 1 in 20 minutes. And here's the flight plan update. A good time to perform this S-Band reflectivity test would be after the completion of P23, and we mentioned that the procedure is on page 3-19A of your flight plan. Your acquisition angle for beginning this test is roll 011, pitch 196, yaw 337. And your high gain angles are pitch minus 010 and yaw 300. In addition, I have roll, pitch and yaw attitudes and high gain angles for tests 1, 2, and 3 if you need them.

SC Okay, stand by.

SC Okay, we're looking at 3-19A now and go ahead for tests 1, 2, and 3, over.

CAPCOM Okay, for tests 1, roll 027, pitch 196, yaw 298. Your high gain angles will be pitch minus 010, yaw 340. For test number 2, roll is 065; pitch is 196; yaw 298. High gain angles are pitch minus 020 and yaw 350. Test number 3, roll 090, pitch 196, yaw 306. And your high gain angles are pitch minus 30 degrees and yaw is 360 degrees, over.

SC Roger, on the call back here. For test 1, roll 027, pitch 196, yaw 298. High gain pitch minus 010, yaw 340. Test 2, roll 065, pitch 196, yaw 298. High gain pitch minus 020, yaw 350. Test 3, roll 090, pitch 196, yaw 306. High gain pitch minus 030 and yaw is 360. Over.

CAPCOM That's affirmative, Tom.

SC Okay, Jack, and then we'll pick this up around 168 hours, over.

CAPCOM Roger, 168 hours and did you copy turning on your H2 purge line heaters? Over.

SC Roger, you wanted that done in 20 minutes or do you want it done now for a period of 20? Over.

CAPCOM We would like you to turn on your H2 purge line heaters now and then start your H2 purge in 20 minutes on fuel cell 1, over.

SC Mark the purge line heaters on.

CAPCOM And that will be a continuous purge on fuel cell 1, over.

CAPCOM Roger, in 20 minutes we'll start - in other words, you want us to continue to purge fuel cell 1 from now on then? Over.

SC That's affirmative. We'll let you know when to terminate the purge on it.

SC Okay.

END OF TAPE

CAPCOM Apollo 10 Houston. We have a request. We'd like for you during the reflectivity test to punch up VERB 64 for us so we can read out the high gain pitch and yaw angles down here on the ground. Over.

SC Hello Houston, this is 10.

CAPCOM Go ahead 10.

SC Get your LCL recovery checklist, if you would, Jack.

CAPCOM Go ahead.

SC Okay, the items I call out are the items that we will stow. That's 1, 2, 3, 4, 5, 6, 18, 20, 21, 22.

CAPCOM Roger, copy.

SC Okay, item 20 and 21 are stowed in the tissue section of A1.

CAPCOM Understand tissue section of A1.

SC 22 is in A8 with the exerciser.

CAPCOM Go ahead.

SC All other items are stowed in a single bag, they will be on the onboard side of A6 strapped down. They'll be between A6 and the bulkhead.

CAPCOM Roger.

SC That's it for the LCL. We're not sure exactly yet where we're going to put the canister.

CAPCOM Roger.

SC You might pass on to Joe that items 9 and 10, which were highly cherished, were unavailable.

CAPCOM Roger, we'll pass the word.

SC Tell him the LCL recovery checklist procedure was not applicable for those 2 items.

CAPCOM Apollo 10, Houston, we have a recommended stowage location down here for the lithium hydroxide canister. It says to wrap it in plastic and wrap it in a sleeping bag and put it in L3. Did you get that word? Over.

SC That's okay, but we're not eating that much food. L2 and L3 are still just about full of food. Over.

CAPCOM Roger, we copied, Tom. Did you wrap the canister up to prevent breathing that hydroxide? Over.

END OF TAPE

CAPCOM Roger, we copy, Tom. Did you wrap the canister up to prevent breathing that hydroxide, over.

SC Roger, we wrapped it.

SC It looks to us like turning the cabin into the sun increases the cabin temperature about 3 degrees.

CAPCOM Roger, John, we copy.

SC Maybe it was 1 degree. Would you believe a half a degree?

CAPCOM Roger. We copy it didn't do much good.

SC Hello, Houston, this is 10.

CAPCOM Go ahead, 10.

SC On that LCL recovery checklist, I did make one mistake. You want to get it out again?

CAPCOM Sure, I got it.

SC I said we brought back items 20, 21, and 22 for stowage. Actually, it was 19, 20, and 22. 21 was really not in condition to bring back.

CAPCOM Roger, we copy.

SC Think about that one.

CAPCOM Roger, I'll pass the word on to the appropriate people and let them think about it.

SC You may not have to go too far. Does super-retro want to know how many tons of gear we left in the LM?

CAPCOM That is affirmative. How many tons did you leave in the LM?

SC Seemed about like 20 or 30. We took earth temporary stowage bag, three helmet bags full of fluid materials, and insulation, which probably doesn't weigh very much and the hatch stowage bag was full of a lot of gear, the hatch stowage bag. Actually, the weight of that stuff was probably - it was a lot in volume, but it didn't seem to be - you know, it didn't feel like much. But there's a lot of weight. We took one temporary stowage bag and three helmet bags, not helmet bags, but those inner bags in the helmets that you keep your gloves in, we had those full of gear, and one hatch bag and it was all full of waste material, I know. I wouldn't even try to guess how much that weighed, but it would be the equivalent of how many days fluid and materials you would normally expect to use by that time.

CAPCOM Roger, we copy.

SC Also, it seems like the docking target got misplaced and went with Snoopy.

CAPCOM Roger, copy and we would like you to start the purge for fuel cell 1 now, please.

SC Okay.

SC But the hatch bag turned out to be a very convenient waste disposal stowage thing. We had that thing just crammed full of stuff.

CAPCOM Okay.

SC Jack, it's after the fact, and as far as LM stowage for that CG on that burn was concerned, but it was stowed opposite the probe and drogue on the right hand side, but like John said, it was big and bulky, but I'm sure it didn't weigh but a couple of 3, 4, or 5 pounds, maybe. And at that time, I didn't think it significant to mention because of the LM CG and apparently it wasn't.

CAPCOM Okay. Stowed opposite the probe and drogue, and it was the hatch stowage bag?

SC That's affirm.

CAPCOM Apollo 10, Houston. We've got some configurations to do on the H2 and O2 tank heaters. H2 tank 1 heater off, tank 2 heater auto; O2 tank 1 heater auto, and tank 2 heater off.

SC Okay, Jack, I've got those. You know, you're the first guy that's ever passed those up in order of H2 1 and 2 and O2 1 and 2. I always get them in some other order, but that's the way I've got them now.

CAPCOM That's left to right, isn't it?

SC I knew it would have to be different from you, but it seems right this way.

END OF TAPE

APOLLO 10 COMMENTARY, 5/25/69, CDT: 1043, 166:54 GET 555/1

ALL DEAD AIR

END OF TAPE

CAPCOM Apollo 10, Houston. Here's something that I didn't get an acknowledgment on, if you're not using the computer during the S-Band reflectivity test we'd like you to do a verb 64 so we can watch the high gain pitch and yaw angles down here, over.

SC Roger, we copied that, Jack, and we'll give it to you.

CAPCOM Thank you.

SC We will be using the computer to make auto maneuvers to those angles, over.

CAPCOM Roger.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, GET 167:14, CDT 11C3 557/1

CAPCOM Apollo 10, Houston, we've got another news item here. In the Atlantic Classic Bruce Crampton is leading, in second place by 2 strokes Bert Yancy, Bruce Develin, and Gary Player. And the unemployed local philosopher, he just showed up unexpectedly and he says that color TV is on its way back just as he predicted, and it's going to make a real splash around here pretty soon.

SC Roger, thank you very much for the news there, Jack.

END OF TAPE

CC Apollo 10, Houston, we notice down here that you are using one RCS quad; unless you'd rather do it otherwise, unless you'd rather continue to do it this way, we'd prefer to use 2 quads cause it does perturb the trajectory somewhat to use only 1 quad at a time; over.

SC Okay - will do. I was just reducing the usage on A' we've got plenty of fuel; just trying to balance it out; I'll go do that. Okay, got 'em.

CC And 10 according to our charts down here they look pretty well balanced and the requirements are such that they should be looking about the way it is right now.

SC Okay, the onboard indicators are pretty optimal; over.

CC Okay, Tom. These folks down here tell me you guys have set the economy record on the fuel usage so far.

SC Roger; thank you; we've been watching it real close; we did use quite a bit in the landmark tracking to really pulse and make sure everything was on there, since we knew how important that was, but other than that, we've been watching it as tight as we could; over.

CC Roger, Tom.

CC Put you in the Mobil Economy Run next year Tom.

SC Yeah, right Ed, hello there.

CC Watch who'll get you for a commercial.

SC Good morning Gordo; how are you?

CC Fine Tom; we enjoyed your readings this morning. (Ed note: ref is to scripture in religious srvice)

SC Roger.

END OF TAPE

PAO This is Apollo Control. While we are waiting for our conversation to resume, a few numbers here. Distance of earth from Apollo 10 is now 120,555 nautical miles; approach velocity now up to 5,921.9 feet per second. Spacecraft weight computed to be 25,200 pounds. Continuing to monitor air to ground. Pretty quiet now. The crew should be involved in midcourse navigation exercise in which stars and earth horizon, either near or far horizon, here goes a call.

SC - that completes the star horizon check. I guess the next activity will be about 168 hours when we come up for the reflectivity test, over.

CAPCOM Roger, 10, we copy.

SC And we are going to open all shades now and get some heat in this place, over.

CAPCOM Roger.

SC And I notice our Quad A temperature has gone up quite a bit, even though it is still lower than what we had in lunar orbit. We'll go ahead and start maneuvering into these attitudes for S-band reflectivity test, over.

CAPCOM Roger, Tom.

SC Hello, Houston, 10.

CAPCOM Go.

SC On the reflectivity test, do you want us to go to these angles we got copied in here for 1, 2, and 3, or do you want us to go to those acquisition angles that we've also got copied in here. They are a little different.

CAPCOM Stand by.

CAPCOM Apollo 10, Houston. We don't see any reason why you can't set up your deadband and then go right into test 1 attitude, over.

SC Okay, fine.

SC Hello, Houston, this is 10.

CAPCOM Go ahead, 10.

SC Jack, you got 319A in front of you?

CAPCOM I have.

SC Okay, step 4 says when high gain meter compares to high gain control, you go through those next two steps and then you record the meter. It appears to me the meter reading is going to be the same as where you set the control needle just to do step 4.

CAPCOM Stand by one.

SC Houston, this is 10. I'll go ahead and record step 5 and if there's any difference, just make note of it. I'll just go ahead and follow through with it.

CAPCOM Roger.

END OF TAPE

SC Houston, this is 10. I'll go ahead and record step 5 and if there's any difference just make note of it. I'll just go ahead and follow through with this.

CAPCOM Roger.

SC Jack, just one other quick question. Step 2 - why, I've got the control values. I used the new control values that you read up to Tom here a little while ago for test 1, 2, and 3. Is that correct?

CAPCOM Stand by one.

CAPCOM Okay, Gene, in step 1 we gave you the attitudes to which to go to get the pitch and yaw angles as specified in tests 1, 2, and 3. And then we still want you to set your high gain control to those settings that are listed in step 2 which are all 20 degrees off in yaw.

SC Jack, you gave us a roll, pitch and yaw attitude and a high gain pitch and yaw for just 1 2 and 3. I'm just a little bit confused. On step 2 do you want me to use the printed numbers in the book or do you want me to use the pitch and yaw that you gave us with the roll, pitch and yaw for tests 1, 2 and 3?

CAPCOM Okay, the attitudes that I gave you were just a convenience number. Those are the attitudes to which you should go to set up your antenna as specified in step 1. Then we want you to slew the -

SC Okay, fine -

CAPCOM Roger, copy now?

SC Okay, yes, I'll use your pitch and yaw for acquisition and then I'll go right through steps 1, 2, 3, and so forth just as written with the numbers.

CAPCOM Right, and then when you go to step 3 this causes you to slew off and then you go to step 4 back to AUTO. This will tell us how well the antenna comes back to the position to which we want it to come.

SC Okay.

CAPCOM And if we get the same numbers in step 5, why, then we know that the antenna is doing what we want it to, and if not, why, we want to know what those numbers are and reduce the data later.

SC Okey doke.

CAPCOM Apollo 10, we're handing over the high gain. You may get a burst of noise.

SC Okay, Houston, we're at the first attitude and I'm going to my ranging switch off and we do have good lock at this attitude.

CAPCOM Roger.

SC Hello, Houston, this is Apollo 10. (garble).

CAPCOM Apollo 10, Houston. We've got lots of background noise. Stand by on your transmission.

CAPCOM Apollo 10, Houston. You have a cution and warning on the H2 press cryo tank. Don't worry about it. In fact, the heater's going to cycle momentarily to bring that pressure back up.

SC Okay, looks like it's tank 1 to us. Tank 2 is well in the green.

CAPCOM Roger, we copy tank 1. It'll cycle (garble).

SC Yes, but the heater configuration switch is off. I just put the heater switch to auto.

CAPCOM Roger, 10, they tell us that tank 1 is going to follow the tank 2 heater cycle, over.

SC Okay.

END OF TAPE

SC Okay.
SC Okay, we got the cryo pressure again. Over.
CAPCOM Apollo 10 Houston. Lets put heaters in both H2 cryo tanks to AUTO. Over.
SC Okay and we're in step 5, test 1.
CAPCOM Roger.
SC Hello, Houston, Houston. How do you read test 1?
CAPCOM We're reading you 10, a little background noise.
SC Okay, very good, I'm going on to set 2 and I'll give you a reading test when it's all over.
CAPCOM Roger.
CAPCOM Apollo 10, Houston, we need the fans on in both H2 cryo tanks. Over.
SC Okay, the fans are on.
SC Hello Houston, Houston, this is Apollo 10. How do you read on test 2?
CAPCOM Read you loud and clear.
SC Apollo 10, we'll proceed to test 3.
CAPCOM Roger on 3.

END OF TAPE

PAO This is Apollo Control, 118 670 nautical miles out from earth. Velocity now 5 969 feet per second. Air-to-ground still live for any possible conversation with the crew of Apollo 10.

SC Hello Houston, this is 10; how do you read?

CC Loud and clear. How me?

SC I'm reading you the same; I've got your readings if you'd like them for one, two, and three.

CC Go ahead.

CC Roger 10; go ahead with the reading.

SC Test one is pitch minus 10, yaw 360, and the percent signal is 65 and it was oscillating about 2 needles width. Two is minus 25, 360 65 percent and steady. 3 is minus 30, meter flipped to 000, 90 percent and steady.

CC Roger, we copied all that; thank you.

SC Okay, Jack. Houston, Apollo 10, we're all set to go back to PTC at this time; over.

CC Roger Tom; set yourself up in PTC.

SC Jack, some added comments on the first and second tests - it appeared to me that the high gain antenna did not regain a signal strength. Hhowever in the third test, it appeared that it did 90 percent.

CC Roger, we copy Gene; thank you.

SC I've got it on the last 3 or 4 days, I've become a high gain fan.

CC Roger. And high gain sure sounds a lot clear and a lot better down here than the OMNI though.

SC Sounds like you're sitting in the cock-pit with us Jack.

CC Apollo 10, Houston; we're gonna do another high gain hand-over here in about 20 seconds, you might expect another burst.

SC Roger.

END OF TAPE

CAPCOM We're going to do another high gain hand over here in about 20 seconds. You might expect another burst.

SC Roger.

SC Hey, Jack, is it 12:00 noon down there?

CAPCOM That's pretty darn close, I've got 12:04.

CAPCOM Apollo 10, Houston. We'll need the S-band nominal ranging switch in ranging, please.

SC Sorry about that, Jack.

END OF TAPE

CC Apollo 10, Houston, we expect you are in the 20 minute wait period for setting up PTC and we notice that we have all 4 quads; we'll only need Alpha and Bravo; over.

SC Roger; I'm still thumbing through my book trying to find out how to do this.

CC Alright.

SC Houston, will you give us a call when you think we've spent enough time waiting?

CC That's affirmative; we'll tell you.

SC Hello Jack; this is Charlie Brown.

CC Go ahead Charlie.

SC We're in the process now of commencing scientific experiment Sugar Hotel Alpha Victor Echo. And its going to be conducted like all normal human beings do it.

CC Atta boy. Roger; we copy; that'll impress the folks in Pago Pago.

SC I don't know whether we're all gonna make it; we're going to take a look at them one at a time, and we may decide that we'll have one test subject.

CC Roger; I hope we'll get a chance to take a look at that on TV tonight, or tomorrow.

SC You will for sure. We'll have it recorded for posterity also.

CC Roger. It can't be any worse than fiberglass.

SC Would you believe what the shaving cream ... packed at 14.7 looks like when you open it up at 5 PSI?

CC Yeah, bet that looks colorful.

SC Its white but colorful.

CC And 10; Houston, we haven't come up with any better ideas on stowing that hydroxide canister; we want to make sure its well protected; doesn't get damaged, so the only suggestion we've now got is to either find a place for it and have a big Sunday dinner and pack it in the L3, or take the stuff out of L3 and put it somewhere else, and pack the container in there; that's it; over. If you come up with a different location, we'd like to know what it is - so we can tell retro.

SC We'll let Gene hold it on his lap. We'll find someplace for it and let you know, Jack.

CC Okay, thanks.

END OF TAPE

SC Houston, this is 10. The test is proceeding very successfully.

CAPCOM Roger, copy. Just as planned.

END OF TAPE

CAPCOM Say, Tom, are those Navy guys getting themselves properly configured to keep up this immaculate Navy image? Over.

SC He's off the head set right now configuring.

SC Jack, I hope you got John and my shoes done early enough to get sent out to the ship.

CAPCOM I was going to say I wondered if you guys had a set of whites up there, or something like that. Maybe you've got some of those short pants they wear around.

SC Houston, how does that look to you for 20 minutes?

CAPCOM We'd like to hold off about another minute to complete the dump.

CAPCOM Okay, 10, it's complete. You can start PTC now.

SC Thank you.

SC Just to break the monotony of this PTC we're going to roll left this time.

CAPCOM Okay, copy left hand pattern.

CAPCOM Apollo 10, Houston. Since you're rolling left this time we'll have to give you some new high gain angles and here they are: pitch minus 50 and yaw 90. Over.

SC Roger.

SC I'm afraid we may have messed this one up. It looks for some reason like we got an operator error when we punched that last button, and it started to rate and went back some way or other.

CAPCOM It looks all right down here, 10.

SC Okay, but there was a lot of jet firing in there when I was trying to initiate the - to start this thing while I was making the entries, which I don't understand.

CAPCOM You probably just have a right-handed spacecraft and he doesn't want to go that way.

SC Houston, can you check and see that the deadband is opened up? I think it is.

CAPCOM Stand by one.

END OF TAPE

CAPCOM We've got you in wide deadband. We don't see anything different than the way it's supposed to be.

SC Okay, Jack. The only thing that I notice is that we're starting with both rates in both the - pitching and yawing a little and we're a little further off than we usually are by this time in the PTC. Usually it's gone for a couple of hours before it gets out 5 degrees.

CAPCOM Yes, we're copying that too, but what I'm say is, you did everything right.

SC Okay.

CAPCOM 10, Houston. Did you call?

SC 10, negative. Houston, 10. Do we have Goldstone acquisition? Over.

CAPCOM Apollo 10, Houston. We're on Madrid right now and expect to get Goldstone about 17130, over.

SC 17130, roger.

END OF TAPE

CC Apollo 10, Houston; we'd like you to turn the H2 tank heaters OFF and tell us what position they are in at this time; over.

SC Stand by; we're kinda scattered all over the spacecraft. H2 tank heaters are in AUTO 1 and 2, and we'll turn them off at this time.

CC Roger; thank you.

SC The fans are both on; over.

CC Roger; fans on, and leave them on.

SC Roger.

END OF TAPE

(DEAD AIR)

END OF TAPE

(DEAD AIR)

END OF TAPE

APOLLO 10 COMMENTARY, 5/25/69, CDT:1333, 169:34 GET 571/1

PAO This is Apollo Control - no recent contact with Apollo 10, conversation wise. Now showing a distance of 115 516 nautical miles distance; velocity 6106 feet per second; showing now about 22 hours, 11 minutes until splash; this number likely will change somewhat when they do the midcourse correction burn number 6 which is now some 7 hours, 11 minutes from now. If and when the conversation does pick up again, we'll come back up live. And at 169 hours, 37 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 169 hours 56 minutes ground elapsed time. Apollo 10 now 112 350 nautical miles out from earth approaching at a velocity of 6139 feet per second. We have about 3 and a half minutes of accumulated tape of brief transmissions that have taken place since last the circuit was up live. We'll play that back at this time.

CAPCOM Apollo 10 Houston. We weren't able to get high gain last time around. We want you to confirm that you are in the reacq mode on the high gain. Over.

SC Okay, we're in reacq now. We were - we were in AUTO before.

CAPCOM Roger, we copy, Tom. Thank you.

SC What angles do you want for reacq? Over.

CAPCOM 10, that's pitch minus 50 and yaw 90. Over.

SC Pitch minus 50 and yaw minus 90, right?

CAPCOM Make that yaw 90, plus 90.

SC Roger, yaw is 90 and pitch is minus 50. Over.

CAPCOM Roger, Tom. Pitch minus 50 and yaw 90.

CAPCOM Apollo 10, Houston. We'd like at this time to terminate the hydrogen purge in the fuel cell 1. Turn off your hydrogen purge line heater and take fuel cell 1 off Main A and Main B. Over.

SC Roger, will do.

SC Hello Houston, this is 10. I've got the purge stopped on fuel cell 1. I took it off the main busses, and the hydrogen purge line heater is off. However, my indicator still shows full scale high in fuel cell 1 for hydrogen flow rate. Can you confirm that the purge has stopped?

CAPCOM Stand by one.

CAPCOM Roger, 10, we're indicating that the purge is not terminated just like you are. Stand by.

CAPCOM Apollo 10, Houston, lets try cycling the fuel cell 1 purge switch for all positions then off. Over.

SC Okay. Houston, I get an indication that I do come off - during this whole purge I was full scale high and I did get an indication when I'd come back off the H2 purge position and I'm coming off of full scale high right at about .20 pounds per hour, and I go back up to the fuel cell H2 purge and it goes full scale high again. So I'm getting some indication in the indicator and I know the indicator's on because it worked okay on the other cells.

CAPCOM Roger, understand you are getting intermittent momentary drop and then back full scale high.

SC Yes, Jack, when I actually go to the purge on position in hydrogen she'll go full scale high and when I go to off it comes back down to the maximum calibrated position which is .20 and I'm watching it now and it appears to me like it's dropping off very, very slowly. I think we may have it okay if we watch it for a while. I think it's dropping down now.

CAPCOM Roger, 10. We confirm that it's certainly coming down now. We'll watch it for a short time here.

PAO This is Apollo Control and that concludes playback of accumulated tapes. At 170 hours ground elapsed time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 170 hours 21 minutes ground elapsed time. Apollo 10 presently 110,871 nautical miles out from earth, coming in 6,180 feet per second. Approximately an hour and a half from now, at 171 hours 50 minutes 49 seconds, Apollo 10 will be exactly midway on the return trip from the moon. Mileage both ways will be 105,410 nautical miles. We have an accumulation of tape of perhaps 2 minutes. It's been recorded within the last half hour. Let's listen to that now.

CAPCOM Apollo 10, Houston. We would like to get a little better handle on what's going on in the H2 tanks, so we would like you to make sure the fans are off in both H2 tanks and the heaters are in auto for both H2 tanks, over.

SC Okay, Jack, we've got the fans off now and the heaters in auto. Is there something unusual going on? You looking at the total quantity?

CAPCOM No, we had reason to believe that one of the heaters may have stayed on one tank a while ago.

SC Okay, fine. I did my hydrogen purge and now it's coming down to .05 and my flow rates excellent, going to hit zero.

CAPCOM Roger, we confirm that.

SC Yes, I don't think you heard me earlier, but the experiment is proving to be za three way huge success and you can pass on to the Governor of Pago Pago that we are ready to kick up our heels.

CAPCOM Roger. We'll assure that you are probably escorted there, to Pago Pago, and the experiment came off successfully. Thank you.

SC Thank you, sir. It really did, Jack. It came off very well, as a matter of fact.

CAPCOM Just like everybody thought.

SC That's right. Just like we had expected.

PAO This is Apollo Control. That completes playback of the tape recording. At 170 hours 23 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 170 hours, 45 minutes. The Black Team of Flight Controllers has relieved the Orange Team. Apollo 10 is 109 413 nautical miles from earth, velocity 6 222 feet per second. Apollo 10 has discontinued the passive thermal control mode and is now preparing to take another set of midcourse star earth/horizon marks. Here's a brief bit of conversation on that subject.

SC Houston, this is 10; over.

CC Go ahead 10.

SC Rog - Wonder if we shouldn't knock this off. This seems to be a little too much rate here.

CC Say again over.

SC I'm wondering if you shouldn't knock this PTC off and do some star landmark or something.

CC Okay, 10, this is Houston; why don't we knock off the PTC now and start working on the P23 again; over.

SC Okay, cause it'll take us that long to get started on it anyway.

CC Right.

END OF TAPE

CAPCOM Hello, Apollo 10, Houston. We'd like for you to turn both H2 cryo tank heaters off. It looks like they're stuck on in the AUTO position, over.

SC Okay, Charlie, they're off.

CAPCOM Roger.

SC How are you today?

CAPCOM How are y'all?

SC We's fine.

CAPCOM And, 10, Houston. We'd like you to verify that the cryo fans are off also, over.

SC Yes, they're off, Charlie.

CAPCOM Rog.

SC Apollo 10, Houston. We're just sitting here looking at your weather tomorrow. It looks like it's going to be about 1800 scattered, 15 knot winds at 5-foot seas. Beautiful day out there and it's a beatiful day in Houston here today with about 90 degrees. There's so many people on Clear Lake you can't even see the water. Over.

SC Roger, Charlie, thanks for the weather report. John's getting started on his optics calibration at this time, over.

CAPCOM Rog, we see it. Thank you, Tom.

SC And also all three of us shaved today just using a very new technique called shaving cream and a razor and it worked beautiful, over.

CAPCOM Rog, that's what Jack passed on to us, Tom. That's really good news. Thanks a lot.

END OF TAPE

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DEAD AIR

END OF TAPE

All dead air.

END OF TAPE

CC Hello Apollo 10, Houston. John could you pause for just about 5 more seconds on the NOUN 49-it's a little too speedy for the guys?

SC Rog.

PAO This is Apollo Control at 171 hours, 40 minutes. Apollo 10 is 106,026 nautical miles from the earth approaching a velocity of 6,322 feet per second.

PAO We're about 9 minutes away from the time when Apollo 10 will be half-way home. The mid point coming at 171 hours, 50 minutes, 49 seconds. We expect the distance-that time to be 105,410 nautical miles to the earth and to the moon.

SC Houston, that completes the sightings.

CC Roger 10. Thank you much. Out.

SC While we've got a couple of minutes here, is there anymore news on today.

CC Say again.

SC I said, we've got a couple of minutes here to listen is there any news today of any sort?

CC Stand by.

SC We heard some news early this morning.

CC Stand by. We'll see if we can get you something.

CC Hello 10, Houston. John your marks puts you within 10 miles of MSFN assessment of vacuum perigee and it was very good. PAO is coming up with some news for you. We'll have it for you in a little while.

SC Okay.

SC Yeah, but is it good enough, Charlie.

CC Roger. Everybody's real satisfied with your marking. Over.

SC Well, I ain't too happy with it.

CC Let me get you some exact figures. Stand by. I'll talk to FIDO.

CC Hello 10, Houston. John you're improving your perigee from set to set. We feel, like on the next set that'd it be close to a MSFN prediction. Right now we have 15 nautical miles for a vacuum perigee and your coming up with 5. Last time, that's a 35 mile improvement over the last set of marks. Over.

SC That's a step in the right direction. Huh?

CC Roger that.

SC Charlie what I want do when I finish this next set and go through P37 for the ignition time of the burn and see what it says I ought to do. Would that be fair?

CC Rog. That's affirmative.

END OF TAPE

SC ---Snoopy is these days.
CC Stand by, 10.
CC 10, Houston, Fido hasn't updated his estimates since the last time we passed it up. He'll work you out one and we'll pass it up in a little bit.
SC Okay. Thank you.
PAO At the midpoint, velocity was 6,341 feet per second.
CC Hello, Apollo 10, Houston. Could your give us a Verb 74? We'd like to look at your erasable.
SC You got it, Charlie.
CC Roger.
SC Why don't you fix anything I messed up in there while you are at it.
CC Roger. We can't find anything you messed up. It's all looking great.
SC Listen, as many times as I punched those buttons, if there is not something wrong, it will be a miracle.
CC Okay.

END OF TAPE

SC Houston, Apollo 10. Over.
CAPCOM Go ahead, 10.
SC Roger. We have reached low enough to start VPC this time?
CAPCOM That's affirmative.
PAO This is Apollo Control at 172 hours, 14 minutes. Apollo 10's distance from the Earth is 103,963 nautical miles. Velocity is 6,386 feet per second. We understand there has been some confusion about the form of shaving cream used by the crew. The shaving cream was in a tube. It was a tube of brushless shaving cream.
SC Okay, Charlie. I think we've got a good one going this time.
CAPCOM Roger, John.
SC It doesn't have any of the rates in pitch and yaw like we started out with last time.
CAPCOM Rog.
SC This things been working really good. It's - ever since the first night. Well, last time we did one we did one to the left and it got out of hand and went into dead band - spent about the entire hour and one half in the dead band.
CAPCOM Well, that's a new one on me. I hadn't heard about it.
SC Yeah. I don't know what caused it, maybe somewhere I pushed the buttons wrong. Anyway we had rates when we started into it which is very peculiar
CAPCOM Rog.
SC Just make sure, the guy that thought that up was really smart. Somebody back there in the back room?
CAPCOM Yeah. I think it was the CMS procedures and the disband guys back there that or AGC or whatever they call themselves that came up with it. I got it in the checklist so we'll go pass it on to the other guys.
SC That's just - boy, that's just great. Looks like it saved you about 100 pounds a mission.
CAPCOM Rog. Hey, 10. We're considering a slip in the midcourse in a half hour to give fido another half hour tracking so we can get a little bit more confidence in his solution. If that's agreeable with you guys, we'd like to proceed that way. Over.
SC Okay, with us.
CAPCOM Okay. We'll plan then about 15740 for the midcourse.
SC Roger.

SC Houston, Apollo 10. The world is just coming around in our left window and it's really starting to get big now. Over.

CAPCOM Rog, 10. We got you out about 105,000 miles right now.

SC Roger, Charlie. When I say big I mean big compared to when we were around the Moon. Over.

CAPCOM Roger.

SC Still looks like the North Pole has the socked in solid cloud deck. It's been there ever since we launched. Over.

CAPCOM Roger. We copy, Tom.

END OF TAPE

SC Houston, Apollo 10. We're taking documentary sequence and still photos about every 4 or 5 hours of both the moon and the earth so we should have a pretty good history of how they look all the way back. Over.

CC Roger. Thanks a lot. I'll pass that on to Jack.

SC Hello, Houston, Apollo 10.

CC Go ahead, 10.

SC Roger. Are you working with Goldstone now, Charlie? Over.

CC Roger. We just had a handover to Goldstone, Tom. Over.

SC Roger. We're sitting up here and we have already gone through our entry -- studied our entry phase for tomorrow and we are just loafing here and thought you'd like to see what three clean-shaven looking individuals look like after 7 days, we could crank up the tube for you and also show you what the world looks like after it starts to draw in the moon really starts to shrinks away. Over.

CC Roger. Stand by. See if we can get the network up. We'd like to see what you look like after yesterday's view of John down there with his patch on and almost we thought the camera was going to break. So, we'd like to see what you look like all fresh. Tom, And, Tom, the PO people just said that they were just in contact with your mother and she's doing great and in great spirits and following the flight very closely.

SC Real good. Tell them I sure appreciate it and thanks a lot. Over.

CC Roger.

CC 10, Houston. The network is working on the -- see if we can get the lines up from Goldstone. Stand by.

CC 10, Houston. It'll take us 30 minutes to get the lines up so we can see it back here, but Goldstone is configured to record. You can transmit now. We have the high gain and we'll look at it in 30 minutes. Over.

SC Okay. I'm looking ahead at the flight plan, the next thing coming up is 174 and we are in no hurry here. When you get the lines up we'll shoot it to you live. Over.

CC Okay. That's fine, Tom. We'll give you the word.

SC Okay. Thank you.

END OF TAPE

SC Hello Houston, this is 10.
CC Go ahead, 10.
SC You might pass on appropriately that our CSM 16 millimeter camera finally failed. It's been trying for two days and it just finally gave it the goat. The fuse has been changed but it just won't accept any temperatures or will not run at all. I'm using the 75 millimeter lens we have in the Command Module on the LM's 16 millimeter camera. This combination worked, although I appreciate the fact that the masking for the lens might be inappropriate but it's the last ditch effort, that's all we have left.
CC Roger. Understand. Your CSM 16 millimeter failed and you're taking the 75 millimeter lens off the LM camera, correction, Command Module and put it on the LM camera. Over.
SC That's affirmed. I guess we should, it's awful frustrating, Charlie. I wish you'd pass the word on appropriately.
CC Rog.
PAO This is Apollo Control at 172 hours, 47 minutes. Apollo 10's distance now is 101,882 nautical miles, velocity 6,452 feet per second.
SC Houston, Apollo 10. Over.
CC Go ahead.
SC Rog. We're looking at Florida through the optics. The Cape's off today. Looks like you'd all might have some clouds out there, little scattered clouds around Houston. Is that right?
CC It was like that when we came in about 4 or 5 hours ago, correction, about 3 hours ago John. Let me see if anybody's been outside lately.
SC Oh, it's no real problem, we're just sight seeing.
SC Boy. It's a beautiful view. You can see the subsolar point in the Gulf of Mexico right about between the Yucatan Peninsula and Mexico proper. And with these optics, I can look all the way into South America. As far south as Chile.
CC Sounds great. Not much happening in the world today. No real predestine news to pass on this afternoon. We've got the ball scores and that's about all, I can read you up those. We've got about 10 or 12. In the National League, Cincinnati 7, Montreal 2. Atlanta 4, Phillie 1. St. Louis 4, LA 0 after 4 innings. San Diego 7, Chicago 1 after 4. New York 1, Pittsburgh 1 after 7 and 1/2, Houston 5, New York 3 after 6 and 1/2 innings. In the American League, Detroit 10, California 0, Seattle 3, Cleveland 2. Baltimore 5, Oakland 3. Kansas City 3, Washington 2. Boston 1, Chicago 0. Minnesota 2 to 1 in the 1st game and 2 to nothing over New York in

CC the second game after 5 innings. Gary Player's leading the Atlantic Classic and A. J. Foyt won the poll position yesterday for the Indy 500 with something like a 170 miles an hour average. Over.

SC Baa.

SC That's, that's dangerous work Babe. That's too fast.

CC Rog. You want to be on your way getting airborne at that state, I think.

SC Yup.

END OF TAPE

SC - you want to have wheels in the well.

CAPCOM 10, Houston. at 173 hours and 10 minutes you'll be 100,490 miles out. Velocity relative to the Earth of 6,498 feet per second. You'll be 109,847 miles from the Moon. Velocity relative to the Moon is 5,776 feet per second. Your sunset time is 1911955. And your subsattelite point is at 173 will be between Caracas and Panama. Over.

SC Roger. We got those down, Charlie. That's how it looks, Charlie, I can tell we're directly between Caracas and Panama. That's what you said wasn't it?

CAPCOM That's affirmative.

SC It's quite obvious up here. Next time we go on one of these trips we're going to take that big display down there with us.

CAPCOM Okay. It's real pretty today. We got blue background and yellow lines and a green spacecraft and an orange Snoopy just dancing around up on the top of the board. FIDO's really outdoing himself.

SC Everytime we make a successful water dump does he light up.

CAPCOM Oh boy, the top of his head just glows. You ought to see him.

SC I wish I could. Yeah. I bet that's a great sight down there. Over.

CAPCOM It really is. He's been grinning the whole flight. He's going to be impossible to live with. 10, a little update on the Atlantic Classic. Bert Yancey and Gary Player are now tied for the lead with about 6 to play on the last round.

SC Very good. Thank you. They'll all be coming to Houston here before long.

CAPCOM Yeah. Just a couple of weeks. It should be fun. Hello 10, Houston. We'd like you to leave the H2 CRYO heaters off until sleep period tonight and at that time we'll bring on 1 fan to store them up and that should bring the pressure up all right. Over.

SC Okay, Charlie.

CAPCOM Hello 10, Houston. Hey, Tom this looks like it's going to take us an hour or more to get building 8 cranked up on the color converter. We're configured for black and white if you want to give us that. We can look at the color later. Over.

SC Okay, stand by one.

END OF TAPE

SC Charlie, we'll just hold off because you will be able to see more of the United States the longer we wait here.

CC Roger. We'll get Building 8 cranked up and let you know. Over.

SC Okay. We've got the optics calibration coming up. I think about 173 to 174.

SC Charlie, if it is going to be more than an hour let us know, will you, because that will be pushing into P23.

CC Roger. We copy, Gene-o. We'll give you a work.

SC Actually, 30 minutes to an hour would be a little bit better, because more of the U.S. continent will come into view at that time.

CC Roger.

SC It's really beautifully clear down there right now. It's just tremendous.

SC I can almost make Tracy splashing around in the back yard.

CC That's what she's doing this afternoon, too, Boy. It's about, as I said earlier, about 90 to 93 degrees out there. We concur on holding off - we could be ready to go in an hour. Over.

SC Okay.

CC Hello, Apollo 10, Houston. We're about to lose high gain. We'll come back around again at 17325 and at that time we will be go for the TV. Over.

SC Okay. Sounds real good, Charlie. Thank you.

PAO That's approximately 5 minutes from now. We will be getting another television transmission from Apollo 10 in about 5 minutes.

END OF TAPE

SC Houston, Apollo 10. Over.
CAPCOM Go ahead, 10.
SC Roger. Do you have a picture?
CAPCOM We're on the omnis there, 10, and if you'll - we'll be about another minute.
SC Roger.
CAPCOM Hey, and we got some information on Snoop at 173:30, 5 minutes from now. He's 208 966 nautical miles above the moon, and he's 405 188 nautical miles above the earth and stand by on his hyperbolic.
SC Boy, he's getting up there.
CAPCOM And he's going hyperbolic with respect to the earth and the moon, so he's moving out away from us, and his velocity with respect to the earth is 7530 feet per second, and he's going into solar orbit.
SC Wonderful. Looks like Snoop's going to take a long trip. Over.
CAPCOM A real long one.
SC Houston, do you have a picture? Over.
CAPCOM That's negative.
SC Houston, Apollo 10. Over.
SC Roger. Looks like this is the moon, and we're about 110 000 miles from it. It still has a sort of a brownish cast to it, and it's still rotating very slowly. You can see when you look out your window tonight, you'll see it's only a three quarter moon or so.
CAPCOM Okay, we just got it up -
SC This is -
CAPCOM We just got it up on the -
SC Roger.
CAPCOM On the telemoniter now. Excuse me, John. Go ahead. Over.
SC This is a full zoom on the lens, so it actually is a little smaller than this on your screen. It's hardly enough to make any definition out of it at all.
CAPCOM 10, Houston. We can apparently make out the Mare. The colors on our vidicon are - has a greenish tent to it, but I think the color quality of the commercial is a little bit better than this, but we can't see the Mare on it. Over.
SC Roger. And at about 110 000 miles, I don't think you expect to see very much.
SC It'll be a couple of minutes before - the before the earth comes around, so let us show you the interior.
CAPCOM Roger. We're standing by for your smiling face. I've heard of the big eye before, but the big hand is ridiculous.

CAPCOM Okay, 10. I think we're looking at Tom's right - left shoulder there now, and the sun's coming in his window. Yeah, there's his old grinning face, clean shaven.

SC Roger. This is remarkable inovation after spending a lot of money on mechanical shavers which always manage to leave the whiskers flying around the atmosphere. Somebody finally came out with the idea of using a straight razor and brushless shaving cream. You rub it on, it keeps the whiskers when you shave it off, you put it in a towel and dispose of it, and you end up clean shaven, and after 8 days of wearing a beard, I guess you're looking at a couple of guys who aren't much hippies.

CAPCOM That's amazing, 10. That's - that's what the space age does for you.

SC I'll tell you, Charlie. That's one of the most refreshing things that's happened in the last couple of days. That was really great.

CAPCOM You guys really look good, Gene. Over.

SC You know, actually, you know it feels a lot different. We were getting where we could barely stand ourselves there for a while.

SC We'll take you down to the lower equipment bay and show you how different our navigator looks today compared to yesterday. On the panel in front of me, you can see the lower equipment bay with the guidance and navigation panel that John works all the time to determine our position and attitude.

CAPCOM There's old one-eye. We got him.

SC There's really not much difference today, is there?

CAPCOM You're - you're right boy, you're right.

SC John likes to play in here. Every time he gets something in his hand, he has to do something different to it.

SC How's the color coming in now, Charlie? Over.

CAPCOM Rog. The interior color is fine. A little greenish tints, but I think that's a problem we got, Tom, with our converter here in building 30. The exterior also had a quite a greenish tint to it, but it's - it's better than the black and white. The black and white has a lot better definition, however, though.

SC Okay, we'll take you outside now and show how the earth looks today. It's starting to get bigger as we approach 100 000 miles.

CAPCOM Roger. We'll stand by for your commentary.

SC Charlie, we'll have it in a minute, and it's just coming right over the window, and here it comes now.

CAPCOM Rog. We have it, 10. Out. Okay, 10 -

SC Okay, again as you look at the - Roger. Again as you look at the earth, it's upside down, so to keep all of you from standing on your heads, we'll just turn the camera upside down for the convenience of your viewing pleasure here.

SC Charlie, we'll be looking at - at the east coast of - of the United States. Primarly down from -

END OF TAPE

SC - and at the east coast of the United States primarily down from off the tip of Florida actually to us here we can see the Grand Bahama Banks, you can see the color changes in the water, you can see most of Florida. It looks like almost all the Gulf of Mexico is extremely clear. The Gulf coast of the United States, Florida, Alabama, Mississippi, Lousiana, on down through Texas all looks clear. We can look on all across from Houston all the way into the San Jaukin Valley, all the way into the Los Angeles area coming over the horizon and the Baja, Californias. We're vertically right now above the Earth somewhere between Caracus and Panama. Charlie, how does the TV look to you down there?

CAPCOM Rog, 10. It's looking real good. The black and white is excellent. Diffination color is coming through on the commercial real fine. Our vidicon here on the big screen has got a lot of greens to it but on commercially it's looking great. Over.

SC Is it saturating right now?

CAPCOM Negative. Only in the North Pole area where the cloud banks are pretty heavy and then only partially up there so - we've got one clear spot up towards the Artic Circle that we can't figure out what it is. Could you give us a little run down on that? Over.

SC Okay. Wait just a minute. It started to disappear out the left hatch window and John will take the camera there and go - take it out through our center hatch window. And here you can see the Earth as it starts to go out the left side window.

CAPCOM Roger. 10, Houston. We got just 30 seconds left on the high gain on this pass.

SC Looks like we won't catch you this time Charlie but that big low pressure cloud so very distinctive over the Alaskan area, Aleutian area is very distinctive with the naked eye. We can't quite get it for you out the hatch window at this time if we're going.

CAPCOM Roger. We'll stand by then. We got about 20 seconds left or so and if you want to show us - it will be - stand by. 8 more minutes and we'll have the high gain back if you want to keep the camera up. Over.

SC Okay, we just wanted to get a - show you how things are going were going aboard Apollo 10 today. So after our shave we all feel refreshed, in fact, we feel just great up here and looking forward to splash-down tomorrow. We got about 100,000 miles more to go but we really pick up the majority of it in the last few hours. Over.

CAPCOM Roger.

PAO Duration of that transmission was 10 minutes, 22 seconds. And Apollo 10's distance is now 98,650 nautical miles. Velocity 6,558 feet per second.

END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/25/69 CDT 1734 GET 17345 587/1

CC Hello Apollo 10, Houston. We've had second thoughts on the fuel cell. We'd like you to bring it off at a midcourse and we'll let you know if we didn't bring it on, it would die out on us at about 180 hours then we don't want to do that. We'd like to keep it for till sep. So we'll give you a minimum time around the midcourse to have it on. Over.

SC Okay Charlie.

CC Apollo 10, this is Houston. Over.

SC Roger, houston. This is 10. We're standing by to set up the optics calibration at this time. Over.

CC Roger. Since we've slipped the midcourse correction No. 6 about 3 zero minutes to roughly 17720, we suggest that you stay in PTC for about another 1/2 hour and slip your P23 by a 1/2 hour to something in the order of 17450. Commence there about. Over.

SC Houston. We're all configured for it and John's getting pretty weary of making all these sights and we want to go ahead and get it over with. Over.

CC Roger. Press on out.

END OF TAPE

PAO This Apollo Control at 174 hours, 20 minutes. Apollo 10 is 96,025 nautical miles from earth. Velocity is 6,649 feet per second and we're about 3 hours away from the midcourse correction burn.

CC Boy, look at that one.

SC Yes. Charlie put me right on the money.

END OF TAPE

SC Okay, Houston. That completes the sightings.

CAPCOM All right 10, this is Houston. Roger, we copy and for your information our latest analysis on fuel cell number 1 shows that it will not be necessary to bring it back on the line at all prior to separation from the Service Module and if this changes we will keep you posted.

SC Roger, Houston. What's your -

CAPCOM Apollo 10, this is Houston. Go ahead. Over.

SC Roger. What's the best burn time you got now.

CAPCOM You mean for midcourse 6?

SC Yes sir.

CAPCOM Roger. 177 hours, 20 minutes GET.

PAO This is Apollo Control at 174 hours, 44 minutes. Apollo 10's distance from the Earth now at 94,434 nautical miles approaching at a velocity of 6,706 feet per second. Showing weight 25,200 pounds.

SC Okay, Houston. You saw our P37 numbers. What do you think?

CAPCOM Roger, we're comparing them with our solution for MED delta V in center of the corridor also. Over.

SC Well, just off hand why don't we burn yours.

CAPCOM Okay.

SC It didn't really look like it was big enough to get us in trouble whether it was right or wrong.

CAPCOM Roger, out.

END OF TAPE

CC Apollo 10, this is Houston. Over.
SC Go ahead.
CC Roger. The pressure decrease in your hydrogen CRYO tanks continues. We are expecting you to get a master caution warning light at about 175 hours, 30 minutes due to low pressure in the hydrogen tanks. We would like you to just punch this out and let the pressure continue to decrease and we'll set you up in configuration for this evening, based on that lower pressure and building it up overnight. Over.
SC Okay. Apollo 10. Over.
SC Houston, Apollo 10. How does it look now to start the PTC over?
CC Roger. you can go ahead and start the PTC now.
CC Apollo 10, this is Houston. When you are ready to copy, I have your pad for midcourse correction No. 6
SC Roger. Just a second. Okay, go ahead.
CC Roger. Midcourse correction 6, RCS, G&N 25200, pitch and YAW trim not applicable, noun 33 step 177195800 plus 00010 plus all balls plus all balls ROLL 088354350, HA not applicable plus 00210 00010 0040010 sextant star 40 2756338, boresight star 033 up 007 left 13, GDC align Vega 36 Deneb 43 roll align 148013018. This will be a 2 quad burn use BRAVO and DELTA, remarks go with the onboard entry pad if you have it still valid. Readback. Over.
SC Okay, Bruce. FCC6, RCS G&F 25200, 48s NA 177194800 plus 00010 plus all balls plus all balls 088354350, apogee is NA perigee is plus 00210 00010 004 3 balls 1 zero, Sextant star is 402756338033 up 007 left 13 Vega 36 Deneb 43 148013018 using 2 quads BRAVO and DELTA and our onboard entry pad is still good.
CC 10, this is Houston, readback correct. Out.

END OF TAPE

CAPCOM 10, this is Houston. If you'd go to accept on your up telemetry, we'll give you a new state vector and target log. Over.

SC Okay, we're going to accept.

CAPCOM Roger. Out.

SC Houston. Mark, we just got the cryo-pressure light.

CAPCOM Roger.

CAPCOM Apollo 10, this is Houston. We've completed the uplink. The computer's yours again. You can go to blot.

SC Thank you.

CAPCOM Roger. Out.

PAO This is Apollo Control at 175 hours, 32 minutes. Apollo 10 is 91,316 nautical miles from the earth. Velocity is 6,820 feet per second. We're a minute - an hour, 46 1/2 minutes away from the midcourse correction. Time for that midcourse burn 177 hours, 19 minutes, 58 seconds. We'll be done with the reaction control system, 2 quads of that system, DELTA-V of 1 foot per second, duration of the burn will be 4 seconds, and the spacecraft will be oriented out of plane to the east during that very short burn.

END OF TAPE

PAO This is Apollo Control at 176 hours. Apollo 10 is 89,458 nautical miles from the earth approaching a velocity of 6,891 feet per second. We're an hour and 18 minutes away from the midcourse correction.

SC Hello Houston, Apollo 10.

CC Apollo 10, this is Houston. Go ahead.

SC Roger. Do you volt it P30 in the last uplink? Over.

CC Confirmative. You had a target load and a state vector in the last uplink. Over.

SC Okay. Thank you.

SC We'll go ahead and go for a P30 at this time. Over.

CC Roger. And for John's information, based on the resultant of his P23 marks, we ran the data in our computer and got the same Delta V result and AL as you did onboard using P37. Over.

SC I figured you would.

CC Roger. We just wanted to run it through the same thorough routine and give you confirmation that the routine you've got was working.

SC Okay. Thank you kindly.

CC Roger. Out.

END OF TAPE

SC Okay, Houston. We've gone through P30. It looks good here. Over.

CAPCOM Houston. Roger, out.

PAO This is Apollo Control at 176 hours, 21 minutes. Apollo 10's distance from the Earth is 88,011 nautical miles. Velocity 6,948 feet per second.

SC Houston. We're going into our rest MED realign now.

CAPCOM This is Houston. Roger, out. Apollo 10, this is Houston. Over.

SC Houston. Go ahead.

CAPCOM Roger, 10. We'd like to make a correction to our scheduled midcourse correction plan of operations here by cancelling midcourse correction number 6 and definitely having midcourse correction 7. A little background on this is that with the long fuel cell purge and the secondary evaporator checkout the tracking still hasn't stabilized to the point where we can give you a midcourse correction number 6 and be confident 100% that midcourse 7 will not be required and if there is a possibility of having to burn 7 the tracking people would like to consider - would like to continue their tracking without the perturbation caused by midcourse correction 6. For your information you're still well within the corridor. These burns were in the form of tweaking to get you in the center of the corridor. We anticipate a Delta V for midcourse correction 7 on the order of 3 to 4 feet per second at the nominal time in the Flight Plan. Over.

SC Okay. Roger, stand by.

CAPCOM Roger.

SC Roger, Houston. Apollo 10. That's what we practiced all along in the simulator so it really doesn't matter to us one way or the other. We can sure do it. Over.

CAPCOM Roger, 10. Then we'll go with not burning 6 and definitely having a midcourse correction 7 at 18850 GET.

SC At 18850. Okay.

CAPCOM Roger, as nominal.

SC Roger.

END OF TAPE

SC Apollo 10 is going back to the PTC roll. Over.
CC 10, this is Houston. Roger. Over.
SC You're definately getting larger in diameter there earth?
CC Roger. I understand you see us growing larger . We can't see you yet with the naked eye, but hope to tomorrow. We're showing you about 90,000 miles out at the present time.
SC Roger. Got a beautiful view here of the earth. It seems like there is a little more like a cumulous thunderstorm above the cloud cover that covers up near the polar ice cap. It really is beautiful the way it stands out. We got a couple of pictures of it. Over.
CC Roger. Over.
SC Houston, Apollo 10. Can you check and see at what GET should we hit night time just before we approach the interface. Over.
CC Roger. Stand by a second.
CC Apollo 10, this is Houston. Time of local sunset will be 191:19:51 GET. Over.
SC Roger. Could you say it again, Bruce, please.
CC Roger. 191 hours, 19 minutes, 51 seconds, GET. Over.
SC Roger. Copy. Sunset at 191:19:51.
SC Houston, this is Apollo 10. Over.
CC Go ahead, 10, we can hear you over the juke box.
SC Okay, would it be okay to run P37 through taking your midcourse 7 time and see what we come up with the state vector we've got now?
CC Apollo 10, this is Houston. Affirmative and we'll run it down here, too. We can compare results if you like, over.
SC Rog.
CC Apollo 10, this is Houston. Over.
SC Houston, go ahead.
CC Roger. Using your vector and our machinery we came up with burn of 2.2 feet per second in X, zero in Y, and minus 0.1 in Z compared with the observed calculations you had on board of plus 2.50 and minus .1. Over.
SC Roger. Ours is plus 2 and one'half and minus .1.

CC Roger. That's what we saw on the DSKY. We got 2.2.

SC What's the matter with your machinery down there.

CC We've got one problem down here right now. There's a rumor going around that by stepping outside the Mission Control Building, we can see you all with the naked eye, so a lot of us are out there looking.

SC Did the machine go out there, too.

SC We can see that the terminator is just passing over Houston right now.

CC Roger. I believe that, but I haven't been outside in a couple of hours.

SC Did somebody really see us out there?

CC That's the report. Charlie is out there looking now and we expect to have an eyewitness account in a minute or so.

SC I don't know what direction but I would expect you would look to the Southwest.

SC Yes. From our angle where we are looking at you, I would say to the Southwest. We're at an angle of at least 45 or 50 degrees. Over.

CC Roger.

SC Anybody can see something 30 feet long at 9,000 miles has really got the eyeballs.

SC Hello, Houston, Apollo 10. Over.

CC Go ahead, 10.

SC Roger. I'm sure you saw the TV pictures here today when they left the moon straight away? Over.

CC Right.

SC Okay, right now it looks like we are doing a reverse process only we are heading straight for the center of the earth, but we all know we are going to be entering from west to east at a gamma of 6.5, don't we?

CC Roger. We're working on that one, Tom.

SC Okay.

SC Sure hope that is a problem you've solved.

SC Bruce, from this position, it looks like we're going to hit just down below Baja, California, going straight in. Just watching the way it is slowly growing here. Over.

CC Roger. Let me get you a current entry interface angle here.

SC Oh, no, no, Fella, we're just kidding about that. It's really funny to watch. It's just a reverse process of after we started to climb out to the moon the other day. Over.

CC Roger.

CC Right now, 10, we're showing an entry interface angle of approximately minus 6.8 degrees. Over.

CC Roger. That sounds real decent. Thank you.

SC Houston, Apollo 10, the FIDO's pretty well squared away with our CG and where we are stowing things? Over.

CC Roger. We're in good shape down here on the stowage and CG.

SC Okay, real fine. Thank you.

SC We haven't yet told you where we are going to show the canister because we're not sure. We are probably going to wrap it up at the base in one of the suits. We'll have to let you know that.

CC Okay, the last word I had on the canister was wrap it up in sleeping bag No. 3 when you got through using it and let's see, you said the food compartment L3 still had food in it, I guess.

SC Roger. You can tell the FIDO's that Food Compartment L2 and L3 all have -- the ones here on the left-- L2 and L3, no I guess just L3 is just about completely filled with food and our waste and one helmet is in B1 down there.

CC Say again what you got in B1 besides helmets, please.

SC Just waste wrappings from the food packs. There was 1 helmet in there and just the waste wrappings from food. Couldn't be over a couple of pounds.

CC Roger. So when you all find a stowage location for the lithium hydroxide canister.

END OF TAPE

CC -so when you all find a storage location for the lithium hydroxide canisters if you'll pass it down to us we'll crank it in.
SC Okay.
SC Houston, Apollo 10. Do the rates look good start the PTC. Over.
CC Roger 10. They're looking good.
CC 10. This is Houston. I'm afraid that report we got on visual observations of you earlier were erroneous and I think it was a planet over there.
SC Roger. I know I would recommend about a 20 power telescope. Maybe 40.
PAO This is Apollo Control at 177 hours, 6 minutes. Apollo 10's distance from the earth is 84,986 nautical miles, velocity 7,071 feet per second.
SC Okay Houston, Apollo 10. We're going to start through the presleep checklist. We're going to purge a fuel cell, make the canister changes. Over.
CC Apollo 10. This is Houston. Would you hold off on the fuel cell purge. You can proceed with the other items at the present time.
SC Okay. Can I take the battery charge off?
CC That's affirmative. Discontinue battery charging.
SC Thank you.
SC Hello Houston. Would you give me a hack of when you want to start the fuel cell purge and also do you desire to stay high-gain tonight?
CC Roger. We'll give you the word on the fuel cells here in a minute.
SC Houston. Apollo 10. Are you ready to copy the CM RCS thruster temps? Over.
CC Roger. Send your message 10.
SC Roger. 5C is 5.1, 5D is 5.1, 6 ALFA is 5.1, 6 BRAVO 5.1, 6 Charlie is 4.0, 6 Dog is 4.6. Over.
CC Roger. We copy and the S-band operations this evening will be OMNI. Request you select OMNI bravo and OMNI onboard and we'll do the switching from down here.
SC Oke Doke. Going OMNI at this time.
CC Apollo 10, this is Houston. You can proceed with the oxygen purge on fuel cells 2 and 3. Over.
SC Roger.
SC Okay Houston. Apollo 10. We're ready for some onboard readouts on the batteries and RCS. Over.

CC Roger 10. Press on-

CC Apollo 10, this is Houston. Go ahead with your onboard readouts.

SC Roger, Bruce. Batt C is 36.8, Pyro Batt A 36 8, Pyro Batt B is 36 8. RCS A 53%, RCS B 65%, C is 65%, D is 60%. Over.

CC Roger 10, we copied.

SC Houston, Apollo 10. Over.

CC Go ahead Apollo 10.

SC All right. Looking forward to tomorrow morning, we don't want to miss the major events and so what we'd like to have you do is wake us up about an hour earlier since we're going to hit the sack a little earlier tonight, we would like to have you wake us up at a GET of 85 hours. Over.

SC That is 185.

CC Roger. We'll wake you up at GET of 185 hours.

SC Rog. You can put a call into the desk and just have them wake us up with some soft music, please.

SC And Bruce, put in an order for sausage and eggs too, would you please?

CC I suggest you hold off on those untill lunch time.

SC Okay. We'll try to.

END OF TAPE

SC (garbled)
CAPCOM Apollo 10, this is Houston. Over.
SC Go ahead, Houston.
CAPCOM Roger. I got your cryo tank configuration for the night.
SC Okay, stand by one second. We'll get it.
CAPCOM Sounds like things are lively up there in the malt shop tonight.
SC Hello there, Dick. Yeah, we're just taking things easy here and relaxing and going through the total program for tomorrow morning, practicing going through the checklist a couple of times and rebriefed it, so we're just taking it easy watching the scene outside which is beautiful and listening to some music. Over.
CAPCOM Roger. That's great.
SC Did you hear me tell Bruce what our impression was of coming back to earth, how it looks just about oposite of going away from the moon? Over.
CAPCOM Roger.
SC Boy, this is really something, Dick.
CAPCOM That last couple of hours is going to be the bear.
SC Yep.
SC Now, from this angle it looks like we're going to approach the earth (garbled) for about 90 degrees.
CAPCOM Yeah. We indicate about 78.
SC Oh, that's great.
SC That current's getting to you.
SC Okay, now I'm ready for the cryo pad. If you want to go ahead and start a panel, I'll configure it.
CAPCOM Okay, I'll just run down the row of switches here. H2 here is 1 off, 2 off, 02 heaters, 1 off, 2 auto, H2 fans, 1 on, 2 off, 02 fans off, off. Over.
SC Okay, I got heaters H2, 1 is off, 2 is off, 02 1 is off, and 2 is auto. On the fans H2, I've got 1 on, 2 off, 02 fans, 1 off and 2 off.
CAPCOM Roger. Readback correct. You're properly configured for the evening.
SC Thank you.
PAO This is Apollo Control estimating the change of shift news conference for 9:30 pm central daylight time.
CAPCOM 10, this is Houston. What are your plans as far as turning in now?
SC Okay, Houston. We're going to - Roger, Houston. This is 10. We're going to go ahead and sack at this time. Over.
CAPCOM Roger, can you give us a crew status

CAPCOM report prior to turning in?
SC Oh, we'd be glad to do that.
CAPCOM Roger. We're interested in getting a hack on the - the radiation now and then after you get back down through the Van Allen belt.
SC Roger.
SC Hello, Houston. This is 10.
CAPCOM Roger. Go ahead, 10.
SC Okay, the CDR is 26048, the CMP is 05048 and the LMP is 15049.
CAPCOM Roger. We copy the PRD's.
SC And we've never seen, on any of the checks we've ever taken either in here or in the LM more than about .001 off of the meter.
CAPCOM Roger. Not any more than .001 on the meter.
SC Well, maybe that scale is .01, Bruce, but it's on the one tenth scale and it's barely readable. Barely above zero. I guess it's .01.
CAPCOM Roger. Barely readable on the one tenth scale.
SC I take it back. It is .001 - .001, the highest we've ever seen anywhere.
CAPCOM Roger. Copy .001.
CAPCOM Okay, Apollo 10. This is Houston. The black team signing off here on behalf of everybody in the MOCR we want to wish you a good night and a safe reentry and a happy landing, and we'll all see you on the ground when you get back.
SC Roger, Houston. We just want to say thanks a lot to the whole team down there. There's been some fantastic support that we've had, we're going to come around and thank all of you personally after we get back to Houston. Over.
CAPCOM Roger. And the maroon team is taking over now.
SC Roger.
CAPCOM Well done there, black team.
SC And thanks a lot guys.
CAPCOM Okay, 10. This is Houston. That big burn's got the eyeballs on you, so you guys hurry up every chance you got and get on home.
SC We're on our way, Joe baby. You just keep a look tonight, keep us in the corridor, and we'll see you soon.
CAPCOM Roger. Go get some huggy pillow we'll keep our eyes on you.
SC Some what?
SC You going to spend the night in the

SC command module?
CAPCOM Roger, that.
SC That's right, you did, and you know.
PAO This is Apollo Control at 177 hours, 45 minutes, and we've completed the shift change here in control. The maroon team of flight controllers headed by flight director Milton Windler, has replaced the black team headed by Glynn Lunney, and our capsule communicator on this shift will be Astronaut Joe Engle. You heard the crew advise that they would be turning in now, beginning their sleep period about 45 minutes early. They were able to do that because midcoures correction 6 which had been scheduled at 176 hours, 50 minutes has been deleted, and we intend to make that midcourse correction at the time planned for midcourse correction 7 which will come at 188 hours, 50 minutes. At the present time, Apollo 10 is 82 272 nautical miles from earth, and the velocity up now to 7,188 feet per second. We don't expect a great deal of conversation out of the crew in the next hour or so as they complete preparations for their rest period, but we'll stand by. This is Apollo Control at 177 hours, 46 minutes.

END OF TAPE

PAO This is Apollo Control at 178 hours, 19 minutes. During the change of shift briefing, we had one brief conversation with Gene Cernan. We now presume that the crew is attempting to get to sleep. We'll play back that short conversation for you now.

CAPCOM Roger, 10. Go ahead.

SC Okay, Joe. I just - we're just getting all configured. I got the duty, I just want to make sure that I can hear you in case I have to, and I guess I can.

CAPCOM Okay, mighty fine. Get a good night's sleep, and I'll see you in about 7 hours and 10 minutes or so.

SC Okay, babe. Listen, any - any news from home front, Mike? At home everything ship shape?

SC Just came from there - yeah, everything's ship shape. We just made a run on your table there in you patio, and I think I'm going to need a little more practice on that.

SC No, man, there's just a few things you gotta know about that one.

CAPCOM Well, I got the lessons from the expert.

SC Oh, I believe it. I believe it. Listen we'll try it when I get back. We'll see you, and I'll - if there's any question about calling - call, will you? And I'll see you tomorrow.

CAPCOM Righto buddy. Okay, good night.

SC Good night.

PAO At the present time Apollo 10 is 79 880 miles from earth and traveling at the speed of 7 295 feet per second. At 178 hours 20 minutes, this is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 179 hours 29 minutes. The Flight Surgeon reports that Gene Cernan, the one crewman on whom we have bio-medical data tonight, appears to be sleeping at this time. The crew advised that at 177 hours 40 minutes that the they were going to begin their rest period a little early, with the plan of getting up a early for tomorrow's reentry activities. About 20 minutes after anouncing that they planned to begin the sleep period Cernan appeared to be sleeping. At the present time Apollo 10 is 74,921 nautical miles from earth, and the spacecraft is traveling at a speed of 7,531 feet per second. During the night the Flight Dynamics Officer and the Return to Earth Officer on this shift will be actively involved in getting the trajectory data and burn data prepared for the mid-course correction number 7, the 7th midcourse correction opportunity which will actually turn out to be the first midcourse correction on route back from the moon. And the current plan is to perform that maneuver at the normal time in the flight plan at 188 hours 50 minutes ground elapsed time. We estimate at this time that that would be about 1 foot per second change in velocity, which of course would be performed with the reaction control system jets. At 179 hours, 31 minutes this is Mission Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0022, GET 180:33 599/1

PAO This is Apollo Control at 180 hours 33 minutes. Apollo 10 presently 70 thousand, 246 nautical miles from earth, and traveling at a speed of 7 thousand, 776 feet per second. We've had no further conversation with the crew since they reported they were going to begin their rest period at 77 hours, 40 minutes. Just a little less than 3 hours ago. The crew is scheduled to end their sleep period at 185 hours, about 1 hour earlier than shown in the flight plan. They also began a sleep period tonight earlier than the flight plan called for. At 180 hours, 34 minutes this is Mission Control, Houston.

END OF TAPE

APOLLO 10 COMMENTARY, 5/25/69, CDT 0123, GET 181:34 600/1

PAO This is Apollo Control at 181 hours 34 minutes. The crew is still apparently sleeping. At this time, we've heard nothing from them since they began their sleep period. And rest period scheduled to end at 185 hours or a little less than 3-1/2 hours from now. At this time, Apollo 10 is traveling at a speed of 8,044 feet per second, and the spacecraft is 65,562 nautical miles from earth. The spaceflight meteorology group said this evening that weather conditions in the end of mission landing area, located 300 nautical miles east of Samoa, are expected to be satisfactory at landing time. partly cloudy skies, east - southeasterly winds at 12 knots and temperature of near 81 degrees is predicted. Reports from weather reconnaissance aircraft, in the landing area, confirm that weather is acceptable at this time. At 181 hours 35 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/26/69, GET 182:33, CDT 0222, 601/1

PAO This is Apollo Control at 182 hours 33 minutes. The crew now has some 2-1/2 hours left in their sleep period. We've had no conversation since beginning of the sleep period, and it appears that the crew has been sleeping the entire duration. We have biomedical information on Gene Cernan only, and the flight surgeon reports that Cernan has been asleep since 178 hours. At the present time, Apollo 10 is 60 872 nautical miles from earth, and the spacecraft velocity is 8344 feet per second. At 182 hours 34 minutes, this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0334, GET 183:45, 602/1

PAO This is Apollo Control at 183 hours 45 minutes. We're now about 1 hour 15 minutes from the scheduled crew wake up time. And at the present time, Apollo 10 is 55 thousand 26 nautical miles from earth. The velocity up now to 8 thousand 766 feet per second. Here in Mission Control on the large center display, we're beginning to see a curvature of the groundtrack which, since transearth injection was a straight line tracing across the earth at about 11, 11 or 12 degrees north latitude, and that line is now beginning to curve southward due to the increasing effect of gravity on the spacecraft, and we're also beginning to see a more rapid increase in the velocity as the spacecraft comes ever closer to earth. This velocity will increase dramatically in the last couple of hours prior to entry interphase. At 2 hours prior to entry the speed will be about 14 thousand 5 hundred feet per second. One half hour later it will have increased by 2 thousand feet per second, up to about 16 thousand 1 hundred 20, and in another half hour, 1 hour prior to entry the velocity will be up to 18 thousand 6 hundred 96 feet per second. Then in the final hour, the velocity will double, nearly double, reaching 36 thousand, 3 hundred 14 feet per second. The flight surgeon reports that all 3 crew members apparently have been sleeping soundly for the total duration of the sleep period. We only have biomedical instrumentation on one of the crewmen, Gene Cernan, but he has been sleeping soundly throughout the sleep period. At 183 hours 48 minutes this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/26/69, GET 184:30 CDT 0419 603/1

PAO This is Apollo Control at 184 hours 30 minutes. The Flight Surgeon reported just a few minutes ago that the bio-medical data showed that Gene Cernan was awake now and we might anticipate a call from the crew before too much longer. At the present time Apollo 10 is 51,156 nautical miles from earth and the velocity has just gone over the 9000 foot mark, presently at 9080 feet per second. Here in Mission Control we're having our change of shift. Flight Director Pete Frank is coming on to replace Flight Director Milton Windler. Frank and his team, his orange team of flight controllers will be handling the reentry and splash. The CAPCOM on the upcoming shift will be astronaut Jack Lousma. At 184 hours 32 minutes this is Apollo Control.

END OF TAPE

APOLLO 10 MISSION CONTROL, 5/25/69, CDT 0420, GET 184:31 604/1

CAPCOM Honeysuckle, this is Houston, contact, 1 2 3 4, 4 3 2 1, give me a short count.

HONEYSUCKLE This is Honeysuckle on Gulf, 1 2 3 4 5, 5 4 3 2 1.

CAPCOM Roger, thank you

HONEYSUCKLE Roger.

END OF TAPE

APOLLO 10 MISSION COMMENTARY,5/26/69,GET: 184:41:20,CDT 0430, 605/1

Dead air.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/26/69, GET 184:51, CDT 0440 606/1

PAO This is Apollo Control at 185 hours ground elapsed time, it's time for wake up of the crew of Apollo 10. We're standing by now for the wake up call.

CC (Bugle call) Hello Apollo 10 reveille. all hands heave out and face up, sweepers man your brooms, clean sweep down fore and aft, take all trash and garbage to the fan tails. Standing by, this is Houston.

SC Oh I love you. Where did you learn that kind of noise.

CC That's Navy noise.

SC That's what I mean. Hey Houston, you're good at TS, that's 30 minutes early.

CC Negative on that.

SC Huh?

CC I want to get you up, it's your last -

end of tape

SC on my left here. Where'd you learn that kind of noise?
CAPCOM It's Navy noise.
SC That's what I mean. Hey, you're - during the PS, that's 30 minutes early.
CAPCOM Negative, no on that.
CAPCOM Tom, I want to get you up because it's your last day to enjoy out there and I don't want you to miss anything. How you guys feeling today?
SC Hey team, I've been looking out that window all night long, so you ain't - you know, I was waiting for that noise anyway. How is you?
CAPCOM We're real good. Listen, if you been up for a little while.
SC ... Off and on. Off and on. It gets pretty anxious up here with that world getting so big. It's beautiful, Dave, it really is.
CAPCOM You look like you're just a hair over 50,000 out now, Geno.
SC 53. Beautiful!
CAPCOM Hey, why don't you guys come on home today?
SC You know, I think we will. Want have you been doing? Taking lessons from Jack or something? I didn't know you knew that kind of music.
CAPCOM Jack doesn't know what it means.
SC Oh, here you come, Joe. Oh, my God, you're about - you're about 3/4 the size of my side window, you're less than a full earth. You're turned over at the poles which means we're going behind you which is good, and oh my golly, are you getting big, and beautiful big. I never thought I'd say that to you but you sure do look good.
CAPCOM You been gone too long.
SC Let me take a look in the binocular and find out where we are.
SC Joe, I'm looking at the Pacific and Indian Ocean, here. I've got the whole continent of India and Asia and coming over the horizon, it appears to be Africa. Beautiful.
CAPCOM Okay, you got a pretty good looking weather forecast for your recovery area. It looks like about 18,000 scattered, 10,000 broken, high broken, 10 miles and the wind's out of the east-southeast, at about 12 knots. The waves are 4 feet, 5 seconds, 81 degrees, and it says widely scattered showers but you can probably get a better handle on that from up there.
SC Okay Joe, what's the present weather?
CAPCOM We're getting it now, Geno.
SC Joe, ... up and feels good putting us into the wind. We'll be down there in about 6 hours.

CAPCOM Say again, Geno.
SC ... to put it into the wind and we'll be onboard in about 6 hours.
CAPCOM Okay, we got it.
CAPCOM Apollo 10, this is Houston. The weather - current weather, is just about the same as the forecast. It looks like it may be getting a little bit better. It looks like they're going about 2,000 scattered high-broken now.
SC And the sea state?
CAPCOM Sea state's 4 feet and 5 second intervals.
SC Sounds good, Joe.
CAPCOM Okay, I'm going to sneak out of here and let the marines take over. I'll see you guys a little later.
SC Joe, thanks for everything, babe. We'll see you back in home.
CAPCOM Roger that.
CAPCOM Good morning Apollo 10. Just got off the gate. I wanted Joe to give you that reveille because I figured that if I gave it to you, you'd consider it a harrasment.
SC Your tack is just too much. Jack, after 8 days, I got to make a public announcement. You're really a great guy, it's just your choice of services.
CAPCOM I think you're talking about the oldest siting service in the country and the best in the world, aren't you?
CAPCOM And watch out for those ...
SC Talking about that gate guard match the US Navy.
SC I guess you're right, Jack. I don't know what the Navy would do if it wasn't for the Marines existance.
CAPCOM Don't forget your astrocast from yesterday. It's the same today.
SC Yes, and I'm not going to say anything about anybody today. This has got to be a good day.
CAPCOM Rog.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/25/69, CDT 0500, GET 185:11, 608/1

PAO This is Apollo Control, still monitering air ground with the spacecraft, now some 46 thousand 867 nautical miles out from earth, approaching velocity of 10 thousand feet per second. Actually 9 thousand 470. The reveille bulge call was played up from mission control for the last day of the mission. Gene Cernan, had been awake for some time observing the earth grow bigger in his window. There was a certain amount of batter back and forth between the ground or the spacecraft communicator, Joe Engle and later Jack Lousma, here in Mission Control and Cernan. Weather in the landing area, shows cloud decked at 18 hundred feet scattered. Wave height, 4 feet, wind 12 knots out of 120 degrees, visibility 10 miles, scattered showers over about 10 percent of the area. Our touch down clock now showing 6 hours 28 minutes mark till splash. We've still got mid course correction burn number 7, sort of hanging fire, as it were. No firm decision has been made yet, wether to do midcourse number 7. Midcourse number 6 was omitted during the night. If midcourse 7 is done it would be primarily to adjust the flight path angle by some 15 hundreths of 1 degree. We're continuing to stand by to moniter air to ground. The crew likely at the present time is eating breakfast. Going through all the housekeeping chores in the spacecraft cabin prior to powering up for todays activity. We'll leave the circuit live at this time and catch any bits of conversation as they take place.

END OF TAPE

SC Hello, Houston. This is 10.
CAPCOM Go ahead, 10.
SC Jack the LM CO2 canister is in the sleeping bag with the suit on the right-hand side and it's at the foot of the sleeping bag, right next to A-6.
CAPCOM Roger. Copy. Thank you, Gene.
CAPCOM Apollo 10, Houston. If you're eating breakfast and got time to listen, I've got some newspaper reports; otherwise, I've got some pads and so forth. Over.
SC Okay, go ahead Jack; we'll listen.
CAPCOM Okay. One technical item first, the hydrogen tank fans, we'd like number 1 off and number 2 on. Over.
SC Number one's going off and number 2's on.
CAPCOM Okay, the Orange Bugle, Pasadena, California: Scientists have found minute forms of life on a volcano racked Antarctic Island. They believe it much like the polar regions in Mars. Dr. Roy E. Cameron, Jet propulsion Laboratory Microbiologist, said in a report released Monday that algae, fungi, and bacteria had started to grow in lava rubble. A year after deception Island was rocked by volcanic blasts in December 1967. Kansas City: The weather bureau Sunday night said that it had received many calls from people in Missouri and Kansas inquiring about a bright object seen to the left of the moon. Many thought it possibly might be the Apollo 10 on its return trip to earth. At first a recording from the weather bureau informed callers the bright object was the planet Mars, but amateur astronomers in Kansas City said it was the planet Jupiter. In St. Louis the Weather Bureau said it had been advised by the President of the Astronomical Society in St. Louis that the bright object near the moon is definitely Jupiter. Aboard the USS Princeton: About 750 -

END OF TAPE

CC It was the planet Jupiter. In St. Louis the weather bureau said it had been advised by the president of the Astronomical Society of St. Louis that the bright object near the moon was definitely Jupiter. Aboard the USS Princeton about seven hundred and and fifty thousand dollars is being spent on live color television of Apollo 10 Monday's splashdown in the Pacific. But the networks are uncertain about the quality of the pictures. The pictures will be beamed by communications satellites to Brusterflat, Washington. From there they will be transmitted by microwave circuit to New York. The trouble is nobody has ever tried to send a picture that far says Carl Hoffenberg, a National Broadcasting Company producer signed to the TV pool aboard this prime recovery ship. Washington - President Nixon celebrated the sixth anniversary of the signing of The Organization of African Unity Charter in a colorful diplomatic reception Sunday evening and promised to work for the future progress and prosperity of that continent. London - Two Soviet Scientists Sunday congradulated the Apollo 10 astronauts for contributing to man's knowledge of space. Soviet astronomer Nikolai Kartochev said on the Moscow radio's english service, "I should like to believe that the American moon flight and the Soviet Venusprobes will promote further progress in space exploration. I wish the crew of Apollo 10 successful completion of their space mission". Professor AlaH Messovitch, a Soviet space researcher, said on the same broadcast, "Soviet and American space probes are advancing in world science". In the sports news, in basebass, Atlanta 4, Phillies 1. The Astros licked the Mets 6 to 3, having won 17 of the last 21 games. I don't think you want to hear about the Cubs. San Diego took a double-header from the Cubs - correction - San Diego 10, Cubs 2 - first game, Cubs 1, San Diego nothing in the second game. And in the golf world, Atlanta Bert Yancy, America's lone hope on a day dominated by foreigners, sank his third consecutive birdie put on the second hole in a sudden death playoff Sunday. Today Australian, Bruce Devlin for the Atlantic Gold Classic's championship. Yancy and Devlin both sank ten-foot birdie puts on the final hole of regulation play to post matching 11 under par 277's that enabled them to finish one stroke ahead of South Africa's Gary Player who also closed with a birdie and to put them into a sudden death playoff. Both had three under par 69s in the final round. And that's the news.

SC Okay Houston, this is 10, we just picked up three more guys. We've got the suits stowed flat. The CMP suit is under the left couch with the helmet on it up in the - excuse me - up in the right couch with the helmet on it as directed yesterday in the sleepbag.

The LMP couch - LMP suit and the CDR suit are under the center couch, stowed as per directed by the North American Document that shows one suit with its head stowed footward, the other head stowed from the head of the couch with the hat on the top of it. Over.

CC Roger copy, thank you.

CC And Apollo 10, Houston, we have another set bit of information here. Spacecraft 106 had a harness which would not release after latching, and the recommendation in your case is to, if you have time and can't get one released, to take it apart at the harness adjustors, or if you have to get out of it in a hurry keep a pair of scissors handy nearby to cut the straps, and both of these methods have been attempted and varified to work. Over.

SC Do you mean which wouldn't let go at the buckle, over.

CC That's right.

SC I'll be darn, how about that. Do you know which harness it was?

CC No I don't, but I can attempt to find out here.

CC Apollo 10, Houston, we will make midcourse 7. It will be approximately 1-1/2 feet per second in order to bring the g level down. Over.

SC Okay Jack.

END OF TAPE

PAO This is Apollo Control. The decision has been made to do midcourse correction burn number 7. RCS burn of about 1 and a half foot per second. It will reduce the flight path angle to, from 6.65 degrees, -6.65 degrees to -6.5 degrees, about 15 hundreths of a degree change, which will there by reduce the entry decelleration from a little over 7 G's to about 6.7 G's. Continuing to moniter air ground for resumption of conversation. A few moments ago the entry interface time was incorrectly identified as splash time. The clock identified as ET is time to entry interface or 4 hundred thousand feet above the earth surface. Now showing 6 hours 4 minutes 40 seconds, mark 64 40. Continuing to moniter air ground.

SC Houston, this is Apollo 10, over.

CAPCOM Go ahead.

SC Roger, when you give us this new REFSMMAT and we go to realign to it, can you give us that attitude, which we will be able to avoid the prospect of gimball lock program alarm to maneuver to, to do the realign, over.

CAPCOM Roger, I understand you want some angles to avoid the program alarm.

SC Yes sir.

SC And some good angles to see the stars.

CAPCOM Roger, stand by we'll get -

SC If possible about 180 from the sun.

CAPCOM Okay, thank you.

CAPCOM In that lap belt business, we don't know which seat that occurred in but it was in spacecraft 108, over.

SC Okay, well that's no problem then. That spacecraft 108's problem.

CAPCOM Rog, I wasn't sure that I gave you the right number. But we just wanted to alert you to this potential problem that arose.

END OF TAPE

SC Houston, according to my star chart, that thing out beside the moon is Jupiter.

CAPCOM Roger, then the expert from St. Louis is correct, right?

SC Also, according to the optics object, that little rascal has about three or four moons running around it right now that you can see through the optics.

CAPCOM Roger.

SC Or maybe it's a fleet of - maybe it's one great big spacecraft with a fleet of a bunch of little ones. I guess we'd better not put that word out.

CAPCOM Yeah, like somebody said before, you guys have been out there too long.

SC Hello, Houston, Apollo 10.

CAPCOM Morning Tom.

SC Roger. Say, how did the Soviet beat us from (garble). Over.

CAPCOM Say again, please.

SC Roger. What about the Soviet beating us from (garble). Over.

CAPCOM Let us research that and get some word.

SC See if you can find out anything about your temperature measurements.

CAPCOM Stand by on the Venus probe, we've got a - some super sleuths working on that.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/26/69, CDT 0550, GET 186:01, 613/1

PAO This is Apollo Control, 186 hours 5 minutes ground elapsed time. Apollo 10 now 42 thousand 616 nautical miles from earth. 9 thousand 9 hundred and 9 feet per second, velocity. The prime recovery ship, Princeton, USS Princeton in the southwest Pacific, is now on station at 15 04 south latitude, 15 04 degrees south latitude 164.41 west longitude. The Princeton reports the sea is as still as a mill pond. We're anticipating the maneuver pad being passed to the crew before too long for midcourse correction number 7, the only one to be made during the return leg from the moon, slightly over 1 foot per second. Some comparisons with Apollo 8. On the return leg from the moon Apollo 8 did the first outbound midcourse correction number 5 in the sequence at transearth injection +15 hours. It was one, the only one made, 5 feet per second. Entry velocity on Apollo 8 was 36 thousand 2 hundred and 21 feet per second, that entry interface. We're anticipating 36 thousand 3 hundred and 14 feet per second, slightly less than one hundred feet per second faster entry on Apollo 10 than on Apollo 8. Continuing to monitor air to ground from Apollo 10 at 186 hours 8 minutes, leaving the circuit live.

SC Hello Houston, this is 10.

CAPCOM Go ahead.

SC Jack, you still want us to cycle the H2 and O2 fans, or just leave them in this configuration.

CAPCOM Apollo 10, Houston. Leave the H2 tank, or the tank fan configuration about the same as it is except that we'd like you to stir up the O2 tanks for a minute or so, over.

SC Okay, thank you.

END OF TAPE

SC Hello, Houston. This is 10.
CAPCOM Roger, I knew it was you calling.
SC Yeah, in addition to those other angles that John was talking to you about earlier. Can you gin us up some TV angles, please?
CAPCOM Roger, I've got the TV angles right here. We'll get John's angles, oh, about the time we have the TV pass, but you ready to copy?
SC Yeah, go ahead.
CAPCOM Okay, TV at 18650, left-hand side window, looking at the earth. Roll is all balls, pitch is 090, yaw is all balls. And your high gain angles will be plus 18 degrees in pitch, and 268 degrees in yaw.
SC Jack, what will our distance from the earth and relative velocity be placed at that time?
CAPCOM Stand by 1, we'll extrapolate that.
SC Okay Houston, this is 10 again. The lithium hydroxide canister for purposing the term of the CG, is burned up against A6, between A6 and A11. It's wedged in there, and the handle bag of water is stowed and A5. It's 25 percent of that half bag of water. It's probably going to be bubbles. I don't know how you weigh that.
CAPCOM Roger, we got some experts here that can figure out how much the bubbles weigh.
SC Okay, and it's half - half filled with water.
CAPCOM Roger.
SC They don't hardly weigh more than the water in OG.
CAPCOM Gene, this is Houston. At 18650, about TV time, you're going to be at 38,435 miles. And your velocity will be 10,402 feet per second.
SC Finally starting to pick up a little.
CAPCOM Yeah, you're getting her. You just crossd the 10,000 foot per second mark right now and you're really starting to move out now.
SC It was going so slow there for a while, Jack, I thought we were about to stall out. Over.
CAPCOM Yeah, I was kind of wondering about all of that mathematics and automechanics, you know. I thought maybe you were going to fall through this time, but it looks like it's going to hang in there.
SC Okay Houston, on the upper hatch there is considerable water up there, and I guess if I was going to design a water separator, this would be a good place to put it.
CAPCOM Roger, we copy.

END OF TAPE

CAPCOM Apollo 10, Houston. On the Venus probe, Venus 5 landed on 16 May, Venus 6 landed on 17 May. Both were launched in January, 6 days apart, as you recall, and Soviet Scientists say that they are fully satisfied with results. Each Probe has returned much new information which indicates and I quote: "Man will never go there" unquote. Their probes made a soft landing, lasted about 30 minutes after landing, measured a temperature of 537 degrees Farenheit. Over.

SC Roger. We'll look into the manned aspect later, but the crew of Apollo 10 wish you would give them our congratulations on their total engineering and scientific success. Over.

CAPCOM Roger, copy. Congratulations to the Soviets on their engineering success with the Venus probes.

CAPCOM Apollo 10, Houston. I have a flight plan update.

SC Go ahead, Jack.

CAPCOM Okay, at 189 plus 10 hours, we'd like you to read out the command module RCS temperatures off the system test meter. Because if preheat is required, we'll want to bring fuel cell 1 back into line. And at 189 plus 20 we'll reservice the primary evaporator, using 3 minutes of water - 3-minute service. And I have a change to your entry checklist, as a result of the fuel cell situation. And the change is on page E-Echo 2-2.

END OF TAPE

CAPCOM Your entry check list as a result of the fuel cell situation, and the change is on page E, echo 2 dash 2 step 6 line 12 change fuel cell 2 man A and B off to read instead fuel cell 1 man A and B off, and in addition we're standing by for your crew status reports and we'd like some PRD readings before you go through the radiation belt, so we can compare them with those afterwards, over.

SC Okay, I'm in check list now. I just want to make sure, the preceeding line says fuel cell pumps parentheses 3 off, corrected by, now it says fuel cell 1 main A main B off, and then it says verified loads balanced, right.

CAPCOM That is affirmative. You've got that right.

SC Okay, well we have fuel cell 1 main A main B off right now.

CAPCOM Roger 10, if we bring fuel cell 1 on then this ... will apply, over.

SC Okay Jack. I'm with you and at 1, at 189 20 we're going to reservice the bat for 3 minutes and at 189 10 we'll read off the CM RCS teps and at that time we'll decide on fuel cell 1 and stand by for those readings.

CAPCOM Roger.

SC Okay crew status check. The CDR, took 1 lomo last night and he's going to take a decongestant just precautionary prior to reentry. The crew slept well last night, from anywhere to 4 to 8 hours sleep a piece. The ... readings are 2 6048 05049 and 15050, and we've completed breakfast. The spacecraft is about 90 percent, 95 percent stowed and we'll be in the couches here, and probably remain pretty much so there from now on in.

CAPCOM Roger, we copy, Gene, thank you.

END OF TAPE

SC Houston, this is 10.
CAPCOM Go ahead 10.
SC I'm going to high gain antenna at this time.
CAPCOM Copied.
SC Hello Houston, when do you want to conduct a VHF check?
CAPCOM Apollo 10, Houston. We're monitoring the VHF and we'll notify VHF check. Over.
SC Okay, fine. We'll be standing by for it.
SC Houston, Apollo 10. We're all squared away in the attitude affirmative flying TV pass. Over.
CAPCOM Roger. Copy, Tom.
SC And Houston, are you going to be receiving this alive at MCC. Over.
CAPCOM Stand by 1.
CAPCOM 10, Houston. TV will be live here.
SC Okay.
PAO This is Apollo Control. As mentioned in the conversation between Jack Lousma and the crew, coming up on a television pass in less than a minute, according to the flight plan. It'll be routed through the Honeysuckle Creek, Australia tracking station over S-band relayed by satellite back to Mission Control, where it will be converted into color and distributed from there. Standing by for the - this morning's television pass, the final one of the mission to begin.
SC Houston, Apollo 10. We're ready to go with the TV if you are.
CAPCOM Stand by 1.
CAPCOM Okay, Apollo 10, Houston. We're going to TV at this time. Over.
SC Okay, Houston, you ought to be starting to pick up a view of earth at this time. We're coming ayard our final TV pass. Let us know when you're getting it, Jack.
CAPCOM Roger Gene, we'll tell you when we're getting it here.
SC Houston, Apollo 10. How does the screen look? Over.
CAPCOM Roger, 10. We're not getting it yet. Apparently everything isn't quite warmed up yet. Oh, hear she comes. She's coming in now.
CAPCOM Okay, we're getting TV of the earth. We see the terminator, and

END OF TAPE

CAPCOM Okay, we're getting TV of the earth. We see the terminator and You're getting it centered up pretty well right now.

SC Good morning from Apollo 10.

SC We're doing now approximately 7500 miles an hour, and we're fine but - we can see part of China India is the most predominant feature, but also we can see Saudia Arabia, the Gulf of Auman and the Indian Ocean at this time. And I'll try to give you a little zoom here in on Saudia Arabia and India - into the Gulf of Auman. The Gulf of Auman is in the center left part of your picture. How does it look down there?

CAPCOM Okay, 10. The Globe is about centering the screen at this time, and we can see the darker land masses and the Gulf of Auman is - but it's a beautiful picture and it's coming through well.

SC Sure is a beautiful picture.

CAPCOM I guess you might say that the artist that painted that one is a master.

CAPCOM I know that looks real good to you guys and the closer you get the better it looks.

SC Jack, one reflection that we felt very strong about is when we show you our last telecast here of the earth is that we felt very strong about sharing with you some of the adventure, the excitement, the challenge has been a reward to these 8 days, and through this endeavor, we hope that we made you and millions of people of the world more of a part of the history that's being made in our day and age.

CAPCOM I know everybody around the world has appreciated the TV pictures and all the effort you went to to make them good. They've all been excellent and I know it's given everyone a better feeling for what we're actually doing and a better appreciation of the program in general.

SC Okay -

CAPCOM And a better feeling for what we're actually doing and a better appreciation of the program in general.

SC Okay, some final just color shots as we look in there. India appears to us to be a purpleish tan over - I see that the sun, the solar sub point is right in the Gulf of Aumen now. It is nearly a yellowish bronze. Beyond that we have Saudia Arabia and Saudia Arabia to us looks a sandy orange. Up to the right, up to the very top of your screen is covered mostly with clouds and this has been the cloud cover that has existed over the northern part of the world ever since we left Cape Kennedy nearly 8 days ago. Down below to the left the long straight cloud is part of the ITC if you can see it, or even down farther than that into the Indian Ocean. But throughout these telecasts, as

SC you can see that the majority of the world is usually covered by clouds. Over.

CAPCOM Roger, Tom, and I think the people around the world are kind of sad to see this to be the last few shots from space for a while, and I know that they've been very interested and enthusiatic about the pictures and the total flight.

SC Roger, it's kind of a feeling of the way for us not to see these beautiful views. Of course, we're certainly looking forward to being back on the good earth in about 5 hours, and it's really been a fantastic overall flight for us, and some of the experiences that we've had all the way from liftoff on the Saturn V to seeing the earth and moon, the lunar orbit work, and then flying out from the moon and all the way back, and why don't we take you inside the cockit for one quick minute.

CAPCOM Okay, we have it inside the cabin now, Tom, and we've got a pretty good look at a clean shaven command module pilot there.

SC This is your old retired philosopher speaking to you from outer space, and telling you that TV is on its way back.

CAPCOM Roger, thank you for those words from the old retired philosopher.

SC We have a little more work to do and then we'll be back, and it will sure be great to be back. It's been utterly unbelievable, the mission has. We've really enjoyed every bit of it, so until we see you again, we'll say so long.

SC Okay, we'll pan over on the right side of the cockpit where Major Gene Cernan -

CAPCOM Hello Gene, how about saying a few words into the microphone?

SC Okay, Jack. I can't tell you what a rewarding and satisfying experience this has been. It's had its moments, as I said, I'm just thankful that through the median of television we've been able to share it with so many people real-time. I'm convinced after this mission none of them are going to be easy, but nothing is impossible, and I think that future manned space flight for now and many generations to come is going to uncover many many other new challenges and experiences that we've yet really incapable of even conceiving at this time. It's been a great 8 days, and of course we're looking forward to get home, and I guess next time we'll be seeing you and talking to you we'll be back on the ground. Thank you.

CAPCOM Hello there, Skipper.

SC Good morning. On the final closeout telecast of Apollo 10 I just want to say that this has just been fantastic - the total views that we've seen on this total mission, again like Gene pointed out, no mission is easy, and it's been a lot of work but we've enjoyed the whole

SC thing greatly, and also the main thing is we've been able to in real-time on some of the major parts of the mission to share this with you. Like we pointed out, that fantastic view when we left the moon, man has certainly progressed a long ways in such a short few years. And how much we're going to progress in the future is left to your imagination, but if we harness our energies and keep our prospective right the goals are unlimited. And we want to take you back out and show you one last picture of the world - wait a minute, we want to show you a couple of other people that have been with us here. We can't here, we've got the spacecraft fairly well stowed, in fact, we're running about an hour and a half ahead of schedule onboard the spacecraft, but as you know we had the lunar module with us which we nicknamed "Snoopy" and Snoopy, the ascent part of Snoopy, is on its way around the sun now. The descent part is still in an orbit around the moon, and right now we're in our code name of "Charlie Brown", and here's again our little mascot Charlie Brown, code name for the command module, and Charlie Brown has been a real good boy. He's been with us all the way. The spacecraft has been fantastic with respect to its systems and its reliability. It's done a beautiful job for the whole program. And how does the color look for Charlie Brown down there, Houston?

CAPCOM The color is perfect, Tom. Good morning, Charlie.

SC And Charlie just wants to say "Good morning" to all you people and it's great to be on the mission, and here is our other friend that went along with us, and for a code name, and as we said part of him is on the way around the sun and the other part around the moon, so he's got quite a split personality. Over.

END OF TAPE

SC - that went along with us and, for a code name as we said. A part of him is on the way around the sun, and the other part around the moon. So he's got quite a split personality. Over. And here's the code name of our lunar module Snoopy. And Snoopy was a fairly good dog for us, in fact he's a fantastic vehicle to fly. But again one thing we want to point out about Snoopy, this is a symbol of a manned flight awareness program and represents the good work and efforts of the hundreds of thousands of people who have made the manned space flight program so successful. And from the crew of Apollo 10, we'd just like to give all those people a salute and acknowledgement, and this is one way of doing it, just by naming a spacecraft after their symbol. And so from the five of us, Gene Cernan, John Young, Tom Stafford, Snoopy, and Charlie Brown, we'd just like to say good by. And here's our symbol for the mission, and we'll see you back on the water in the South Pacific. In fact we should land about 300 miles east of Samoa and approximately 5 hours. So from the crew of Apollo 10, it's been great being with you and good by.

CC Roger, thank you Tom. Preparations are well under way for your return and recovery and we're looking forward to seeing you real soon.

SC Roger. Tell all the people around the world, Jack, and also in Houston, MCC, what a geat job they've done, and we'll see them back there shortly, over.

CAPCOM Roger, Tom, thank you and congratulations to you and your crew, over.

SC Roger. We'll wait until we get on board the carrier for that.

SC Hello, Houston, this is 10. Do you want me to maintain high gain for you unitl after the update?

CAPCOM That is affirmative, 10. We prefer the high gain for the update.

SC Okay.

CAPCOM And Apollo 10, Houston. I have some attitudes for P52.

SC Stand by. We're still doing some stowing here. Go ahead and give me a rough one, Jack.

CAPCOM Roger. The P52, we have two attitudes. Probably the preferred is the one I'll read first and if you want another one, I'll give it to you.

SC Go ahead.

CAPCOM Roll, pitch, and yaw are all balls.

Your stars are Menkent, number 30, Atria, number 34, and Nunki, number 37.

SC Roger, roll, pitch, and yaw all balls, stars 30, 34, and 37.

PAO This is Apollo Control at 187 hours 11 minutes ground elapsed time. Apollo 10 now 36,136 nautical miles out from earth.

END OF TAPE

PAO This is Apollo Control at 187 hours 11 minutes ground elapse time. Apollo 10 now 36 thousand 136 nautical miles out from earth. Velocity continuing to build up. Now 10 thousand 709 feet per second. Estimated velocity at entry interface are 4 hundred thousand feet above the surface, 36 thousand 314 feet per second. Ignition time for midcourse correction number 7, 1 hour and 37 minutes away. Entry interface 4 hours 36 minutes away.

SC Apollo 10, I'll stay in this attitude until you give us the update, then we'll go down to zero, zero, zero, over.

CAPCOM Roger, we copy, ten.

CAPCOM Apollo 10, Houston, we're ready with your update. We've got a state vector and entry REFSMMAT and a midcourse 7 target load, and if you will go to ACCEPT. In addition, we're not reading anything on the VHF yet, and we'd like you to ensure that the VHF is cranked up, over.

SC Okay, Houston, Apollo 10. We are in POO and ACCEPT. I've got the VHF warming up and we'll give you a call in just a minute. Over.

CAPCOM Roger, ten.

SC Hello, Houston, this is Apollo 10, on VHF A simplex. How do you read, over.

CAPCOM Roger, I hear you loud and clear, ten, on VHF A.

SC Roger, Houston, this is 10 reading you loud and clear, over.

CAPCOM Belay my last, ten. I think I'm getting you on S-band. We'll check with the VHF people.

CAPCOM Apollo 10, Houston. Carnarvon read you loud and clear on VHF.

SC Roger, Houston, Apollo 10. I'm reading you about 3 by 3 on VHF. How me?

CAPCOM Apollo 10, Houston. I'm reading you here on S-Band and we'll have to check with the sites to see how the VHF is coming in.

CAPCOM Apollo 10, Houston. We're on VHF only. How do you read? Over.

CAPCOM Apollo 10, Houston. How do you read on VHF? Over.

CAPCOM Apollo 10, Houston back on the S-Band. Apparently you weren't reading us on VHF. We'll give you another VHF check in about a half an hour.

SC Okay, Jack.

CAPCOM Apollo 10, Houston. The uplink is complete; you can go to block.

SC Okay.

SC Houston, Apollo 10. I'll go ahead

and pitch down to 000 when you have everything as far as the uplink complete and verified. Guess it is verified now, over.

CAPCOM Roger, the uplink is complete, Tom, and you're clear to -

END OF TAPE

SC I'll go ahead and pitch down to 0000 when you have the - everything as far as the uplink is complete and verified; yes, it is verified now; over.

CC Roger; the uplink is complete Tom; you're clear through the new attitude.

SC Roger. Houston, 10, this attitude of 0000 will be a good one to torgue to the new REFSMAT; over.

CC That's affirmative 10.

CC Apollo 10, Houston, we'd like you to go to wide beam width and height and high gain antenna and I have a maneuver pad and an entry pad for you.

SC Okay, we'll be with you in one second -

END OF TAPE

CC Apollo 10, Houston; we'd like you to go to wide beam width and high gain antenna and I have a maneuver pad and an entry pad for you.

SC Okay, we'll be with you in one second; I'm going to wide beam width right now.

SC You're in wide Houston, and we'll give you a call when we're ready to copy; we're still doing a few little chores here; over.

CC Roger.

SC Hello Houston, Houston, this is Apollo 10; we're ready to copy your P30 and your entry update.

CC Roger 10; here's the maneuver pad. MCC7 - RC G&N 2532 noun 48 is NA, noun 33 is 188, 49 5675 plus 00016 minus all balls minus 00001, three balls, 129, three balls, apogee is NA, perigee is plus 00212 three balls, 16 007 00016 40 2959 383 033 uniform 159, Lima 12, the rest is NA; your set stars are Deneb, 43 and Vega 36, 067, 174 343 your ullage is a 2 quad burn, use Bravo and Delta; read back maneuver pad; let me know when you're ready with the entry pad; over.

SC Okay, MCC 7, RCS G&N, 25232 48 NA, 188, 49 56 275 plus 00016 minus all balls minus 00001, roll is 000 129 000 -

END OF TAPE

SC - 00016, minus all balls, minus 00001, roll is 000 129 000 apogee is NA, perigee is plus 00212, 00016 007 00016 40 2959 383 033 uniform 159, Lima 12, Deneb 43, and Vega 36, 067 174 343; you need need 2 quads, Bravo and Delta, and I'd like to read now 33 back to you again.

SC That's 188 49 56 75.

CC Thats affirmative 10; entry pad when you're ready.

SC I'm ready Jack.

CC Okay, the entry pad is a Mid Pac, 000153 001 191 31 54 268 minus 1507 minus 16467 068 36315 652 12041 36395 191 48 54 0028 noun 69 is NA, D zero is 400, 028 - correction - 02 08, 0018 0329 0817 40 2621 347 033 Dog 089, Lima 22, lift vector is UP. Comment: Use a non-exit pattern; your horizon is dark and reentry interface. Over.

SC Okay Jack. Entry pad. Area is Mid Pac. 000 153 001 191 31 54 268 minus 1507 minus 16467 068 36315 652 minus 012041 36395 191 48 54 0028 noun 69 is NA; are you still with me?

CC That's affirmative.

SC D zero is 400 0208 0018 0329 0817 40 2621 347 033 DElta 089 and Lima 22, the lift vector is UP, using a non-exit pattern and horizon is dark and entry interface.

CC Roger 10; I have a late correction at the bottom; SPA is Dog 080 now. Over.

SC Roger, DA is 080.

CC And 10; we'd like you to read the range field back please.

SC Okay, the range to go is 12041.

CC Roger, we copy and that's affirmative.

PAO This is Apollo Control. To translate some of the exchange of numbers between the spacecraft and the ground, they were passed up a maneuver pad for midcourse correction burn number 7; will be with the RCS thrusters. At 188 hours, 49 minutes, 56.75 seconds, 1.6 foot per second velocity change, burn time of 7 seconds, the additional - the other pad for the entry numbers to the Mid Pacific prime recovery line, nominally along 165 west longitude. Showing target point of 15.07 top latitude, 164.67 west longitude, maximum G's expected 6.8, velocity at 400 000 feet, or entry interface, 36 315 feet per second, flight pattern angle at 400 000 feet, 6.52 degrees. The range to go at the time the entry monitor system is activated, 1 204.1 nautical miles. Velocity at the time the entry monitor system is activated and the crew begins reading the onboard displays of range to go, steering commands and so on, 36 395 feet per second. Begin blackout 18 seconds after entry interface, end black out 3 minutes 29 seconds after entry interface, drogue deploy -

drogue parachute deploy 8 minutes, 17 seconds after entry interface. They were also informed that the horizon would be dark at entry interface. Now 187 hours, 52 minutes ground elapsed time -

END OF TAPE

PAO - now 187 hours 52 minutes ground elapsed time. Showing 57 minutes 40 seconds mark to ignition of midcourse correction burn number 7. Three hours 56 minutes 28 seconds to entry interface. Distance now 31,956 nautical miles out from earth; speed continuing to increase to now reading 11,336 feet per second. Continuing to monitor air to ground circuit for continuing conversation of Apollo 10 crew, with spacecraft communicator Jack Lousma here in Mission Control.

CAPCOM Apollo 10, Houston. We know the system DAP is now set up for four jets and we think we ought to have two jets. That's B and D, over.

SC Okay, roger. You want, since it's only a couple of feet per second here and everything, we've got plenty of fuel, but we'll go ahead and use two jets. Our checklist calls for four, over.

CAPCOM Roger, 10.

END OF TAPE

SC Houston, this is 10. We're going into the cold soak in our checklist there.
CAPCOM Roger, 10, copy.
SC Houston, this is 10. What's your feeling about putting fuel cell 1 on for the burn?
CAPCOM Stand by one.
CAPCOM Apollo 10, Houston. We don't need fuel cell 1 for the burn and don't intend to use it for the burn, over.
SC Okay.

END OF TAPE

CAPCOM - don't intend to use it for the burn, over.

SC Okay.

SC Houston, Apollo 10. We're starting through our P33's now, over.

CAPCOM Roger, 10.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/26/69, GET 188:21 CDT 0810 627/1

CAPCOM Apollo 10, Houston. We suspect that your suit circuit heat exchanger may be in the bypass position and water comofrter ought to be on now and go to bypass at EI minus 50. Over.

SC Roger.

END OF TAPE

CC Apollo 10, Houston, when it is convenient we'd like to get a GET time hack with you.
SC It's convenient; over.
CC Roger; go ahead and give us a time and we'll set our clock.
SC Okay, its 188:34 - 5 , 6, 7, 8, 9, 10, 11, 12, 13 14, 15 - over.
CC Thank you very much; we're right on.
SC Thats computer time and GET time, and the mission time is right on.
CC Roger; we're following right along with you.
SC Houston Apollo 10.
CC Go ahead 10.
SC Okay, we are gonna go ahead and call up P41.
CC Okay, we'll be watching you.
PAO This is Apollo Control, 188 hours, 39 minutes ground elapsed time, coming up on 10 mark to the burn, mark, 10 minutes to ignition of midcourse correction burn number 7, air-to-ground still live.
SC Houston, Apollo 10. Would you give us the hack at 5 minutes prior to the maneuver just so we can recheck our event timer. Over.
CC Roger; understand you want a time hack just prior to the burn, is that affirmative?
SC Give us one at 5 minutes; this event timer occasionally has been jumping numbers; over.
CC Roger, we'll give you a hack at 5 minutes; that'll be about another minute and a half yet.

END OF TAPE

SC Our event timer occasionally has been jumping numbers, over.

CAPCOM Roger, we'll give you a hack at 5 minutes. That'll be about a minute and a half yet.

SC Okay, Houston, we're showing 7 minutes, mark. How's that sound?

CAPCOM Yes, we're showing the same. That's confirmed, 7 minutes.

SC Roger.

SC Okay, we're proceeding here for the final trim.

CAPCOM Roger, 10.

SC Boy, this is absolutely fantastic. Come all the way back to the moon and do this kind of midcourse.

CAPCOM Yes, that's pretty good shooting, isn't it?

SC Man, I mean to tell you.

SC Tell Christopher C. and Company looks like they have a pretty good rifle scope there to shoot us back in this target, over.

CAPCOM Roger, I guess all that mathematics really works after all.

SC Roger.

CAPCOM Apollo 10, Houston. We have a few configurations - items we'd like to point out.

SC Okay, go ahead.

CAPCOM Rotational hand controller power direct B megs at 1 right 2, over.

SC Roger.

PAO This is Apollo Control. Mark, 30 seconds to ignition.

SC We're burning.

SC Okay, how we are on our residuals - you can read them, 0 minus 1 minus 1 and a proceed.

CAPCOM Roger, we copy.

PAO This is Apollo Control. Midcourse correction burn number 7 scheduled for 7 seconds duration was actually burned out at 6.6 seconds.

END OF TAPE

SC Houston, Apollo 10. It's starting to get real cool in here. We would like to go bypass on the suit circuit heat exchanger, over.

SC And we can turn it on when it gets warm again, over.

CAPCOM Roger, 10, go ahead.

SC Bypass.

SC Hello, Houston, this is 10. Could you give me a short comp and I'll cut off my S-band and see whether I can pick you up on VHF?

CAPCOM Stand by one, please.

CAPCOM Apollo 10, Houston. We'll try a VHF voice check as soon as we get the sites configured and you can go to left antenna, over.

SC Okay, thank you, Jack.

CAPCOM Apollo 10, Houston. Set your VHF and S-band turned down. We're going to try the VHF check in a minute.

CAPCOM Hello, Apollo 10, Houston on VHF through Guam. How do you copy? Over.

CAPCOM Apollo 10, Houston. How do you read? Over.

CAPCOM Apollo 10, we're back up on S-band. We weren't able to read you on VHF, over.

SC Roger. We heard some kind of transmissions in the background, but we never gave you a call on VHF, over.

CAPCOM Roger. I asked for a radio check on VHF. Apparently we're not quite in range yet.

PAO This is Apollo Control. Apollo 10 now 24,469 nautical miles out from earth; velocity now 12,794 feet per second. Still monitoring air to ground, live.

CAPCOM Apollo 10, Houston. All sites are monitoring VHF downlink. When you are ready, make a transmission and they will see if we can pick you up.

SC Roger, Houston. This is Apollo 10 transmitting on VHF on the short count. 5, 4, 3, 2, 1. How do you read? Over.

CAPCOM Apollo 10, Houston. Sites apparently aren't reading you yet on VHF. We recommend that you transmit simultaneous S-band and VHF and when the sites can read VHF, why they will let us know, and we will conduct the radio check, over.

SC Roger, that's what we're going, over.

END OF TAPE

CAPCOM We recommend that you transmit simultaneous S-band and VHF and when the sites can read VHF they'll let us know and we'll conduct a radio check. Over.

SC Roger, that's what we're doing. Over.

SC Okay, Houston, Apollo 10, we're all squared away and way ahead on the checlist. The next thing we're waiting for is just to read out the command module RCS temps and service the primary evap and the logic check coming up. Over.

CAPCOM Roger, and there is no significant change in the weather in the landing area. The altimeter is 2988 or plus 38 feet, and we have a slashdown computed time of 192:03 and sunrise will be 25 minutes later. Over.

SC Roger 192:03 sunrise 25 minutes later. Thank you.

CAPCOM Roger, and you copy altimeter 2988?

SC Roger.

SC Hey, Jack, we don't have any place to set the altimeter, but thanks for the plus 38 feet.

CAPCOM Roger, plus 38.

CAPCOM And 10, we're ready for your RCS temps when you're ready to read them down.

SC Houston, here's our readings: 5 Charlie is 5.0; 5 Delta is 4.8; 6 Alfa is 5.1; 6 Bravo is 5.1; 6 Charlie is 4.2; 6 DElta is 4.9.

CAPCOM Roger, 10, we copied the temperatures. Thank you.

SC Houston, at 45 minutes to EI - to RRT time - could you give us a time hack? Over.

CAPCOM Roger, you want a time hack at 45 minutes to EI.

SC That's affirm.

CAPCOM And your computer landing time now is precisely 192:03:57.

SC Houston, we're going back on with the suit circuit heat exchangers. It didn't take very long.

CAPCOM Roger to on.

CAPCOM Apollo 10, Houston, correction on your landing time is 192:02:57.

SC Roger, 192:02:57.

CAPCOM Buddy, you're going to get there. It doesn't really matter does it?

CAPCOM Yes, we could put you in a holding pattern for a minute there maybe.

SC As long as the RET times are okay we're in good shape.

SC Houston, Apollo 10. Over.

CAPCOM Go ahead.

APOLLO 10 MISSION COMMENTARY, 5/26/69, GET 189:20 CDT 0850 631/2

SC Roger, wish you would relay on to Captain Cruse, the skipper of the Princeton, that the time there, at 192:03 we expect to be right on top of the aim point and hope this big ship is close by. Over.

CAPCOM Roger, we'll pass the word on, and you just holler "Meat Ball" when you see it.

SC Will do.

PAO This is Apollo Control. To recap that last exchange, predicted touchdown time in ground elapsed time 192 hours 2 minutes 57 seconds. Back to air to ground.

END OF TAPE

SC Okay, Houston. Our data up here shows no preheat.
CAPCOM Roger, we confirm that, 10.
PAO This is Apollo Control, mark 2 hours 30 minutes to entry interface, or sensible atmosphere at 400,000 feet above the surface. Apollo 10 now 22,150 nautical miles out from earth. Velocity beginning to increase - air to ground here.
SC - glycol evap waterflow valve will come on in 20 minutes.
CAPCOM Roger, 20 minutes.
SC Now leave it on for 3 in auto, is that correct?
CAPCOM That's affirmative, 10.
SC Okay, thank you.
PAO Velocity now 13,399 feet per second, beginning to build up as they get back closer into earth - air to ground still live.
CAPCOM Apollo 10, Houston. We would like to have all heaters and fans off in the cryo tanks, over.
SC Roger, Houston. Fans going off in the cryo tanks.
SC They're all off.
CAPCOM Roger.

END OF TAPE

SC Houston, the evap servicing is complete and for the record, of course, we had been there before but I had gone to manual increase again on the valve.

CAPCOM Roger, we copy and manual increase.

SC And I know I've got the water flow in AUTO.

CAPCOM Roger, 10.

SC Houston, this is 10.

CAPCOM Go ahead, 10.

CAPCOM Apollo 10, Houston, go ahead.

SC Roger, we're requesting an inroute descent commencing 1200 out and we'd also like expeditious handling CCA down near the Princeton. We'll be making a vertical descent from about 24,000, and request NO GO around this pass.

CAPCOM Roger, report crossing 25 miles at 6000, over.

SC How about that? Houston approach hasn't changed a bit.

SC We hope on this one, Houston approach at 6,000 will be within about a half to a quarter of a mile, over.

CAPCOM Roger, you can write your deviation up when you're on the ground.

SC Roger.

END OF TAPE

APOLLO 10 COMMENTARY, 5/26/69, CDT: 0920, 189:31 GET 634/1

SC Hello Houston, 10; what's our range to mother earth?
CC Okay, 10, we're reading 19 660 at this time.
SC Okay, and how fast we going?
CC You're coming in about 14 100 feet per second, you're really picking it up.
SC Thank you sir. Its that last 10 000 miles thats more interesting anyway. Hello Houston, Apollo 10, over.
CC Go ahead 10.
CC Apollo 10, Houston; go ahead.
SC Roger, Houston. We still have lots of propellant in our primary propellant tanks but we wanted to know for the service module jettison, if you want us to open the secondary propellants; over.
CC Stand by 1 please.
SC Roger.
CC Apollo 10, proceed as per the check list; over.
SC Roger; as per check list.

END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/16/69, GET 189:41:20 CDT 0930 635/1

SC Okay, Houston, we're ready for the logic sequence check now.

CAPCOM Stand by one, Apollo 10.

CAPCOM Okay, Apollo 10. We're ready to go with the check. Over.

SC Okay, the ELS logic is coming off, ELS going to auto, 6 logic is coming off. Okay, we're all set up.

CAPCOM Roger, 10, stand by.

CAPCOM Okay, Apollo 10, we'll give you a GO for pyro arm.

SC Roger, 6 logic coming back on.

END OF TAPE

APOLLO 10 COMMENTARY, 5/26/69, CDT: 0940, GET 189:51:20 636/1

SC Houston, this is 10; we completed the sextant star check and Altair was within about 6 minutes of being right in the middle of the optics.

CC Roger; we copy 10.

END OF TAPE

SC Hello, Houston, this is 10.
CAPCOM Go ahead, 10.
SC Do you want to remain high gain here until just before sep?
CAPCOM Stand by one.
CAPCOM Apollo 10, Houston. Let's stay in high gain until sep and then go to omni C, over.
SC Okay, that's omni Charlie, is that right, Jack?
CAPCOM Omni Charlie at sep. Let's stay in high gain until that time, over.
SC Okay, fine, thank you.
CAPCOM I think you're lucky there in a nominal five.
SC Wait until you see the next one.

END OF TAPE

SC How about that, Jack? Over.
CAPCOM That's not bad for a young fellow.
CAPCOM Okay, you proved a point.
SC I told you. Wait until the next one.
CAPCOM You're just a show-off, that's all.
SC How about that, Doc?
CAPCOM That ain't bad.
SC - work with those optics.
CAPCOM Who is doing that, you or Jose?
SC No, that's Jose, I'm just narrating here.
CAPCOM Oh, okay.
CAPCOM Apollo 10, Houston. Our tracking data now shows you right in the middle of the fairway with a 6.53 degree entry angle, over.
SC Roger. Right in the middle of the corridor with 6.53, roger.

END OF TAPE

SC Houston, we checked NOUN 61 and it looks loaded correctly now.

CAPCOM Roger, we're checking it.

SC Roger, our sextant - our alignment check sextant star on Nunki - the auto optics put the stars within the center of the reticle.

CAPCOM Roger, copy, John.

CAPCOM Hello 10, NOUN 61 looks good to us.

SC all righty.

SC Roger.

SC Okay, Houston, EMS check passed successfully.

CAPCOM Roger, EMS. Thank you.

SC Okay, Houston, as I was driving the scroll down to - down to the pattern the thing stopped scribing.

CAPCOM Roger, she stopped scribing.

CAPCOM Say again John.

SC I say, the EMS stopped scribing as I was driving it down to the test pattern - to set it up on the (garbled) range.

CAPCOM Oh, you mean driving it down to 37 K?

SC Yes, I can't get that - it stopped scribing.

CAPCOM You say the needle's not scraping or it's not driving in this -

SC It's not - the tape is driving but the needle is not leaving any mark.

CAPCOM Understand.

SC I believe I'll go ahead and run it on down here anyway.

CAPCOM Roger, you might as well.

SC When it gets some g's on it it might work okay.

CAPCOM It's worth a try.

SC Okay, we're set up at 37 K.

CAPCOM Roger, maybe it'll come back in.

SC On a (garbled) pattern.

SC Houston, this is 10. Have I got a GO to activate the primary evaps?

CAPCOM Stand by one.

CAPCOM 10, Houston, activiate the primary evaps.

SC Okay, here -

END OF TAPE

SC Am I going to go to activate the primary evap?

CC Stand by 1.

CC 10 Houston, activate the primary evap.

SC Okay, here goes.

SC Okay, Houston, we are going to maneuver to the sep attitude now.

CC Roger. Maneuvering to sep attitude.

CC Apollo 10, Houston, John, if you haven't already tried it, you might, on that EMS scroll, try running the tape back a half inch backwards and back and forth between the 37 K line, and if that doesn't work, well, you can try the next pattern, and maybe this will break up that emulsion a little bit.

SC Roger; understand. Run the scroll back and forth between where and where; over.

CC Make sure you run it backwards first, backwards no more than half an inch, and then forward no more than the 37 K line. Over.

SC Roger. By golly, that fixed it. Good thought there. What I did - is I had it on range set, I went back to test 5 - does that mean that I have to go all the way through the EMS counterclockwise anymore, or if I go to range set will it still be initialized at 7 K; K; over.

CC Roger, Tom; say again how far back you went please.

SC About 3/8ths of an inch.

END OF TAPE

SC About 3/8ths of an inch.
CAPCOM Stand by one.
SC Hello, Houston, this is 10.
CAPCOM Go ahead.
SC Roger, we're getting a lot of noise on the high gain in this sep attitude. How about me going to omni at this time?
CAPCOM Stand by.
CAPCOM Apollo 10, Houston. Let's go to omni Charlie by the checklist, over.
SC Okay, we'll hold off on it then, but it's awful noisy up here.
SC Okay, Houston, we're going back to the initial entry interface attitude. This noise is about to drive us wild up here on that high gain.
CAPCOM Roger, 10, it's okay to go omni Charlie now if you'd rather.
SC Okay, we can go there now, huh? Okay, because we're a little bit ahead of the checklist in going into this attitude. That's why I asked. Okay, we'll go to omni Charlie at this time.
CAPCOM Roger.
CAPCOM Apollo 10, Houston. It's not clear to us actually what you did with the EMS. Will you describe it one more time so we can give you an answer? Over.
SC Roger, I was on range set when you said wiggle it back and forth so I went back to test 5 and brought it back approximately 3/8ths of an inch toward 38 K and it started scribing so I quit and went back to 37 and I'm now on test 5.
CAPCOM Roger.
SC My question is -
CAPCOM Go ahead with your question.
SC Do I have to go through another scroll pattern or go clean through the EMS test to get it reset at 37 K?
CAPCOM Roger, we'll get an answer for you in just a minute.
SC I think the answer is no.
CAPCOM Apollo 10, while we're coming up with that answer, we're ready to uplink a state vector. Can we have the computer? Over.
SC We're in CMC and ACCEPT.
CAPCOM Roger, thank you.
CAPCOM Apollo 10, Houston. We're a little delayed on our uplink. It'll be up momentarily. It's coming now.

PAO This is Apollo Control. Mark 1 minute to entry interface at which point the Apollo 10 will come back into the, effectively, the earth's atmosphere at 400,000 feet.

CAPCOM We show a difference in the last pad, over.

SC Okay, Jack, take them one at a time, will you, and let meconfirm them, would you?

CAPCOM Okay, our gamma at 400 K is now 6.54, over.

SC 6.54 gamma at 400 K.

CAPCOM That's affirmative and our RET at .05 g is 0027.

SC 0027 at .05 g, RET.

CAPCOM Okay, that's affirmative, and the next three numbers are in the blackout block. Begin blackout at 0017, end at 0328, and drogues at 0816, over.

SC Okay, I got begin blackout at 0017, end blackout at 328, and drogues at 816.

CAPCOM That's affirmative.

SC Thank you.

PAO This is Apollo Control. To correct a statement earlier in reading the clock, it's now 57 minutes to entry interface instead of 1 minute.

SC It shows we got a 22.2 mile vacuum purge. Looks good.

CAPCOM Roger, 10, and on your EMS, you can go directly to range set and it will work, over.

SC Roger, thank you. I thought it would. And Houston, we're ready to activate the secondary evaps.

CAPCOM Apollo 10, Houston. Let's hold off until EI minus 50, about 6 and a half more minutes, for the secondary evap, over.

SC Okay, we'll hold off.

END OF TAPE

CAPCOM Apollo 10, Houston, let's hold off until EI minus 50, about 6 and a half more minutes, for the secondary evap. Over.

SC Okay, we'll hold off.

PAO This is Apollo Control. Distance is now down to 9136 nautical miles, velocity building up now at 19 128 feet per second.

CAPCOM Apollo 10, Houston. We'd like to proceed with the VHF check now, and we're configured at this site. If you'll transmit we'll listen. Over.

SC Roger, we're reading you right now VHF and short count follows: 123 4554321.

CAPCOM Roger, you came in way down in the mud. You faded out and then came back in.

SC Roger, you're about 3 by and down in the mud.

CAPCOM Roger, and I've got 1 more number to change on your entry pad.

SC It's okay to get on the S-band, huh Jack?

CAPCOM Roger.

SC Hello Houston, this is 10. How do you read?

CAPCOM Read you loud and clear now, 10.

SC Okay, you're still down in the mud. Go ahead with that update.

CAPCOM Okay, the next change is on EMS range to go should read 12061. Over.

SC Roger, 12061.

CAPCOM That's affirm.

SC Okay, sounds like you're transmitting on VHF and S-band, too, Jack. Can you go back to S-band only? Over.

CAPCOM Roger, S-band only.

CAPCOM Apollo 10, Houston. We have change to your altimeter. Your DELTA-H will be plus 57. The recovery ship is on station, the aircraft are enroute. Over.

SC Roger, plus 57.

SC Okay, Houston, I'm going to activate the secondary evaps.

CAPCOM Roger, 10, go ahead.

END OF TAPE

CAPCOM Apollo 10, Houston. There's no change in the weather in the landing area, 2500, scattered and 10, winds are one through zero at 10 knots, 3-foot swells, and we are coming up on our 45-minutes check momentarily.

CAPCOM Okay, John, stand by for a 45-minute check, 4, 3, 2, 1, mark.

SC Okay, thank you.

CAPCOM Rog.

SC We need a go for pyro alarm engines RCS.

CAPCOM Okay, John, we are go for pyro arm.

SC Roger.

SC Stand by to fire the pyros, 3, 2, 1, mark.

CAPCOM Apollo 10, Houston. Both rings look good here.

SC Roger, they look good to us, too.

PAO This is Apollo Control. Some 43 minutes now from entry interface. Present distance 6,916 nautical miles out. It's reported that Rescue Aircraft Numbers 1, 2, and 3, staging out of Somoa are now on station. Ground elapsed time now 191 hours 6 minutes. Continuing to monitor air ground as the crew approaches the separation time at the entry interface minus 15 minutes. Now 42 minutes from entry interface.

PAO This is Apollo Control. Both rings of the command module reaction control system have been pressurized. Pyrotechnics are armed, both rings are showing normal pressure at this time.

SC Houston, how did it look?

CAPCOM You're looking real good there, John.

SC Boy, it feels real good. It's a real crisp fire.

PAO This is Apollo Control. The three rescue aircraft are C130 herkybird turboprop aircraft. Rescue 1 aircraft commander is Captain Jerald D. Parker of Barberton, Ohio. He is with the 76th Air Rescue squadron out of Hickam Air Force Base, Hawaii. Rescue 2, Captain John D. Ott, Milwaukee, Wisconsin, 79th Air Rescue squadron, Andersen Air Force Base, Guam. Rescue 3 aircraft commander is Captain Anthony A. Vanagas, of Carnei, New Jersey, 76th Air Rescue squadron, Hickam Air Force Base. 39 minutes to entry. Standing by on air ground live.

END OF TAPE

SC Okay, Houston, the bus ties are on the line okay, tape recorder is going to rewind. And the sun is setting just like you said. And here comes the earth.

CC Roger 10, and the batts look good.

SC Roger. Its amazing to see an air glow on the horizon again; over.

CC Yeah, you guys are a little out of your enviroment now, aren't you?

SC Yeah, didn't see that any around the moon.

SC Its a good round one, I'll tell you that.

PAO This is Apollo Control; present altitude 4 296 nautical miles, 27 minutes away from entry interface. About 12 minutes away from seperating the service module from the command module; this takes place at 15 minutes prior to 400 000 feet, or what is called entry interface. Still live on air-to-ground.

END OF TAPE

SC Okay, Houston, we're half way through the sep checklist and we're maneuvering to the separation attitude.

CAPCOM Roger, we're watching you.

SC Houston, 10, looks like we might have a primary evap.

CAPCOM That's affirmative, 10, primary evap is working.

PAO This is Apollo Control 21 minutes from entry interface -

SC attitude now. We've completed the sep checklist.

CAPCOM Roger 10.

PAO It's reported that the Apollo Range Instrumented Aircraft, acronym ARIA, are beginning to take their stations along the ground track of Apollo 10 for relaying radio communications back through to Houston. 21 minutes now to entry interface. About 6 mintes to separation of the service module. Still live on air-to-ground.

SC Okay, Houston, calling up program 61.

CAPCOM Roger, 10, program 61.

CAPCOM Apollo 10, Houston. We'd like to verify that the S-band power amp switch is in low. Over.

SC That's affirmative, it's in low.

CAPCOM Thank you.

PAO This is Apollo Control. Program 61 is entry maneuver to command module/service module separation attitude. Now a little over 3 minutes away.

CAPCOM Apollo 10, we'd like to update your landing cue card. You passed 90 000 feet at 0626. Over.

SC Roger.

SC Roger, thank you.

SC I guess we have a GO for pyro arm separate here MSFN.

CAPCOM That's affirmative, 10, you are GO for pyro arm.

SC Roger.

END OF TAPE

SC Okay, we're showing sep time.
CC Roger, 10, go ahead.
SC Okay, we'll go on and separate it about 30 seconds early. At 44:30. 5 4 3 2 1 SEP. RCS transfer to command module. The separation was normal.
CC Roger 10; we copy.
PAO This is Apollo Control, good seperation has been confirmed. Apollo 10 just crossing the West Australian Coast and a long track toward the splashdown point, 350 nautical miles east of Pago Pago, American Samoa. Leaving air-ground live for any transmissions that do take place prior to entry and beginning of black out.
SC Okay, Houston, that was a good sep.
CC Roger 10, we confirm a good sep.
SC What happened there was it had started our EMS, and I wonder how to reinitialize that; should we run all the way through the test back?
CC Stand by.
PAO This is Apollo Control, present altitude 1 385 nautical miles.
CC Apollo 10, Houston. On the EMS situation, the best thing to do is to go counterclockwise on your switch back around to test 5, then advance to the next non-exit skip pattern.
SC Roger.
CC Reset your range and your V 0and you're ready to go again; over.
SC Roger.
PAO This is Apollo Control.
SC ... right now.
CC Roger 10 we copy.
PAO This is Apollo Control, the discussion has to do with the entry monitor system in which a visual display is given to the crew for describing the entry range to go from entry interface. Apparently the thing has sorted itself out, certain amount of levity here in the control room as the recovery plot television display shows the Red Baron on station. This is Apollo Control. The Red Baron has been replaced now by the Apollo Range Instrumented Aircraft ARIA number 5, however, the small sketch of an airplane looks right out on the recovery plot stranegly looks like a Sopwith Camel.
SC Okay Houston, we are in perfect reentry attitude.
CC Roger 10.

END OF TAPE

SC What we're doing up here in entry attitude is just compensating for a little water boiling off

SC Houston, could we have a mark at 5 minutes to RRT? Over.

CAPCOM Roger, mark 5 minutes at RRT.

SC And we're all set up in EMS configuration, ready to go, and I believe it's going to work.

CAPCOM Roger, we copy.

SC And we're in V63. I'm sure you can read it on your DSKY, and R to go is decreasing and DI is increasing. Everything looks good, over.

CAPCOM Roger, 10.

CAPCOM Apollo 10, we missed your mark at 5 minutes. 4 minutes and 50 seconds coming up. Mark.

SC Okay.

PAO This is Apollo Control. Four minutes, 34 seconds to entry; 18 minutes, 34 seconds to splash.

PAO Present altitude 395 nautical.

PAO This is Apollo Control. We're estimating S-Band communications blackout at 18 seconds after entry interface which is about 3 minutes, 37 seconds from this time.

PAO This is Apollo Control. Velocity now up to 35,317 feet per second climbing about 10 feet each second or so as the display turns over. Range to go 23,000 - no, as you were. Move the decimal point over, 2,292 nautical.

CAPCOM You guys are looking real good from here. We'll be attempting to contact you again after blackout at 328, over.

SC Roger. You working through an ARIA now?

CAPCOM Negative, not yet. We will be then, however.

SC Roger. Okay, the guidance is coming in. Looks good.

CAPCOM Roger, 10.

PAO Apollo Control here. 35,927 feet per second, increasing rapidly. 1,845 nautical, range to touchdown. Mark 1 minute to entry interface.

SC Roger.

PAO Mark entry interface. Velocity 36,331 still increasing; downrange to splash point 1,315 nautical miles. We had S-Band blackout on predicted time, about 17 or 18 seconds after entry interface. Estimate coming out of the blackout at 3 minutes, 29 seconds after entry interface at 400,000 feet. Maximum g loading of the spacecraft

and crew will be in the neighborhood of 6.7 g's. Drogue parachute deployment now predicted for 8 minutes, 17 seconds retro elapsed time or entry elapsed time in this case since there has been no retrofire from a lunar return mission. All aircraft in the primary recovery area are on station. Splashdown will be approximately 25 minutes prior to local daylight in the Princeton prime recovery ship area which is standing by on the aiming point. Likely orbiting around the aiming point rather than right on it. Two minutes passed entry interface. About a minute and 29 seconds left in blackout. Velocity now 36,363 feet per second. Apparently that was the last velocity in tracking prior to blackout.

END OF TAPE

PAO - should be out of blackout at this time. We have a first report that Somoa rescue 1 aircraft, staging out of Hickam Air Force Base, has a visual contact. We have a report of visual contact from Airboss 3 on station near the Princeton. It's reported from the Princeton that they on board the prime recovery vessel have visual contact of Apollo 10. Apparently that is radar contact rather than visual. No confirmation of visual at the present time.

SC Houston, we show it 6 miles short right now and we're showing it - Showing about 4 g's. This machine is fling like crazy. Boy, it's really going.

CAPCOM Roger, 10, we copy and we've got you on TV.

SC I tell you, this thing is beautiful.

SC It shows about two miles overshoot, 1.7, 1.2 cross range.

SC We show about 3-1/2 g's now, we're rolling right 60 degrees and we're practically on top of the target. EMS is reading 21 miles to go.

SC Run down, looks like we're about 150 K right now.

SC Apollo 10. At the present rate, we're going to be there shortly.

CAPCOM Roger, 10, we're waiting for you.

SC (very broken)

CAPCOM Apollo 10, you're coming in borken but we still have you visual, over.

PAO It's reported from the prime recovery vessel Princeton that they heard a sonic boom from Apollo 10. Somoa rescue 2 aircraft has S-band contact. A lot of speculation as to whether the item in the television picture from the ship is actually the spacecraft or the service module. Recovery aircraft 3 has a visual with the spacecraft on parachutes. A lookout on board the Princeton reports sighting the spacecraft on the main parachutes. We're still about 25 minutes away from sunrise at the Princeton.

PAO It's reported from photographic aircraft in the area that all three chutes are deployed, which is quite obvious from the television coming from the prime recovery vessel. It's early twilight, early morning dawn at the ship. Still enough daylight to see the spacecraft.

(Broken communication between spacecraft and Airboss)

SC We'll see you at 15 07 at 16467. We should be right on top of you if you're down there.

END OF TAPE

(Garbled)

SC Roger, this is Apollo 10. (garbled) We are in great shape. Over.

CAPCOM Roger, (garbled)

AIR BOSS (garbled) This is Air Boss. (garbled) at 4 miles.

AIR BOSS Apollo 10 (garbled) and splashdown.

REC 3 This is Recovery 3. Splashdown was Stable 1. Repeat: Stable 1.

AIR BOSS Roger.

PAO And we had splashdown at 192 hours 3 minutes 25 seconds, approximately. The spacecraft is in stable 1, that is apex up, about 4 miles estimated from the Princeton.

REC Air Boss, (garbled) Over to 1 wilco.

REC 3 Air Boss, 3, we have 2 drogue chutes in sight. Hello, Boss 3, the drogue chutes are from 0 (garbled) estimating at 7 miles. They are coming down at about 7000 feet now.

AIR BOSS Recovery 3, how do you read?

REC 3 20365 (garbled)

PAO Latest estimate now 3 miles from the Princeton.

AIR BOSS (garbled) Recovery 3, the chutes do not appear to have detached. There are still shroud lines over the command module.

REC 3 Roger, that's because they fell back (garbled). Over.

SC Hello, Princeton, this is Apollo 10. (garbled) Over.

PRINCETON (garbled)

AIR BOSS Princeton, Air Boss. Over.

PRINCETON We have the (garbled) aircraft on sight.

AIR BOSS Roger. Apollo 10 is calling. They have you in sight. Do you have them is sight? Over.

REC 3 This is Recovery 3 and the command module is 090.

AIR BOSS Roger.

PRINCETON Apollo 10, this is Princeton Control. We have you in sight.

AIR BOSS Control from Air Boss, the drogue chutes now are at 030 (garbled).

SC Recovery, this is Apollo 10. This looks like a great chance to get a few parachutes -

AIR BOSS Apollo 10, Air Boss concurs and (garbled)

SC (garbled)

AIR BOSS That's affirmative and welcome back to earth on behalf of prime recovery (garbled)

SC You don't know how glad we are to be here. (garbled)

(Garbled)

REC 3 Princeton, this is Recovery 3. The command module is pitching up 10 degrees.

AIR BOSS Air Boss 3, we'll want both drogue chutes with a short burner.

(garbled)

AIR BOSS This is Air Boss 3, Roger, Air Boss 1's strangle and Air Boss 2's strangle, I'm at (garbled) now.

PRINCETON We lost your signal.

AIR BOSS Air Boss 3 has (garbled)

PRINCETON (garbled) 060. 6 miles.

(garbled)

REC 3 3, the drogue chutes -

AIR BOSS Recovery 3, Air Boss, we're going to mark the long burner coming back over data

REC 3 This is Recovery 3. Apex cover is floating (garbled) command module.

AIR BOSS (garbled) one of the chutes and the red is deployed. (garbled).

AIR BOSS (garbled) do you have anything to relay. Over.

PRINCETON We copied all of it.

AIR BOSS Roger, and Bridge, from Boss, are you reading? Over.

PRINCETON (garbled)

PAO This is Apollo Control. Recovery Helicopter Number 3 is now presently on approach to drop swimmers. The swim team, first one to go out in the jumping order will be Boatswain Mate First Class J. L. Boisvert of Imperial Beach, California who was also involved in Apollo 6 recovery. Second man out will be Seaman Michael G. Mallory of Alderwood Manor, Washington. Number 3 man out will be Lieutenant Junior Grade Wesley T. Chesser of Arlington, Virginia. We'll rejoin what readable conversation there is between Air Boss and the crew of Apollo 10 through the carrier.

Supposed to be coming to you at (garbled) 5003.

AIR BOSS This is Air Boss, Roger. First aircraft in the area will be backup. The craft will get a mark on these drogue chutes and get them relocated.

REC 3 And this is Recovery 3. The apex cover is marked for the short burner.

SC Okay, rescue, this is Apollo 10. Take your time and take it easy. We've got a good sea state and we want you all to be careful.

REC 3 Recovery 3, Roger.

SC Roger.

END OF TAPE

AIRBOSS Control, AIRBOSS, the drogue chutes have ... to look for them ...

RECOVERY 2 This is Recovery 2 on station at this time ... Over.

AIRBOSS AIRBOSS: Roger.

RECOVERY ... in the water ...

AIRBOSS AIRBOSS roger. ... in sight. Recovery 3 is ready; over.

(Broken comm between AIRBOSS and RECOVERY 3)

PAO Recovery 3 moving into position for dropping the first swimmer; Recovery 3 is piloted by Commander Charles B. Smiley, of Chula Vista, California. Co-Pilot is Lt. Jay Scott Walker of Long Beach, California, who was also involved in the Apollo 8 recovery operation.

RECOVERY 3 Swimmer is in the water with the sea anchor approximately 20 or 30 feet from the command module at this time; over.

PAO First swimmer has jumped into the water.

RECOVERY ...

AIRBOSS Arrirmative. Come on overhead at Angels 2.

RECOVERY This is Photo 1. The swimmer is at the module at this time and is attaching the sea anchor.

AIRBOSS Boss 3, Boss -

AIRBOSS Go ahead 3.

AIRBOSS 3 Overhead at the present time.

AIRBOSS AIRBOSS 3; roger. Anchor overhead at Angels 2 ... over.

RECOVERY Photo 1, the swimmer has attached the sea anchor at this time and is attempting to free the shroud lines from over the command module.

RECOVERY Apollo 10 this is revovery 3. The medical officer requests that you report on your dondition. Over.

SC Would you tell the medical officer to just relax, because we are in great shape. Over.

RECOVERY You are in great shape. Roger. Out.

SC Garbled.

RECOVERY ...

(broken comm)

RECOVERY ... 2 swimmers and the sea anchor in the water at this time (garbled) The three swimmers are taking the glotation collar to the command module at this time.

PAO This is Apollo Control; we had confirmation that all 3 swimmers are in the water.

AIRBOSS AIRBOSS 1 to BOSS 3. Reguest you -

AIRBOSS Boss, Wilco.

ARIA This is ARIA 5; we are using VHFat this time PAC net is unusuable.

PAO This is Apollo Control; the 3 swimmers in the water presently are attaching the flotation collar underneath the command module.

SC ...

RECOVERY Photo 1, the collar is half way around.
AIRBOSS Recovery 1; AIRBOSS. No joy on the drogue -
PAO Flotation of the collar approximately half way around the spacecraft.
RECOVERY Photo 1, the collar intallation is all the way around at this time and the swimmers are attaching the two ends.
SC Hello Recovery 3; Apollo 10.
RECOVERY Apollo 10, Recovery 3, go ahead.
SC Roger; we told you we'd be on spot. How far did we take you off the spot? Over.
RECOVERY 3 This is Recovery 3. Be advised the captain says you win, but the bet was a close contest: Over.
SC Okay. Tell him thanks a lot for being here. over.
RECOVERY 3 Roger. Will pass. Recovery 3 relaying from Apollo 10. He says thanks for being here. Over.
PAO Princeton reported now 2000 yards away -

END OF TAPE

PAO Princeton now reported 2000 yards away from the spacecraft and making its approach. Flotation collar now being inflated.

PHOTO 1 The collar is inflated.

PAO Inflation of the flotation collar complete.

PHOTO 1 Photo 1 the swimmers are on the collar at this time. Air Boss please do not come too close to the module on your oass. Over.

PAO Three swimmers are now sitting on the collar, that flotation collar that's supporting the command module. The landing platform helicopter Princeton, carrier Princeton, affectionately know by its crew as "Sweet Pea" is skippered by Captain Carl M. Cruse of Woodville, Texas, who coincidentally is a distant cousin of Orange Team Flight Director Pete Frank. To go back and review splash time, 192 hours, 3 minutes, 25 seconds.

AIRBOSS (garble).

PHOTO 1 The swimmers have the raft at the module at this time and are inflating it and attaching the securing lines.

PHOTO 1 Photo 1, the capsule raft is inflated and the swimmers are (garble) at this time.

PHOTO 1 The riding very steadily, the flotation collar is inflated and good and the raft is inflated and (garble).

PHOTO 1 ... is secured and the swimmers are opening the hatch. (garble)

PAO We've had confirmation from the recovery vessel Princeton that the command module hatch has been opened and the Apollo 10 crew egress is likely to take place as they climb out onto the raft and await pickup by the recovery helicopter.

PHOTO 1 Is open.

PAO Recovery vessel Princeton now estimates 1100 yards from the ship to where the command module is floating.

PHOTO 1 They put a man in the water to secure the raft (garble). .. command module.

PRINCETON Roger, go ahead (garble).

AIR BOSS The astronaut is in the hatch and on the flotation collar. He's now in the raft.

PAO One crewman of Apollo 10 is out on the raft as reported from the ship, unknown at this time which one it is.

PHOTO 1 The second astronaut is out of the command module and is in the raft at this time.

PHOTO 1 All three crewmen are in the raft.

PAO It's reported that all three crewmen are now in the raft awaiting pickup by the recovery helicopter.

AIR BOSS (garble).

AIR BOSS We're getting the signal from theswimmers to commente the pickup operation.

PAO Helicopters now moving into position to lower the net for picking up the crew.

PHOTO 1 (garble).

PAO The device lowered from the helicopter is known as a Billy Pew net.

PHOTO 1 The first astronaut is in the net.

END OF TAPE

PAO Here in Mission Control the room is getting rather crowded as people from the back rooms and off-duty flight controllers move in to watch the recovery operations on the 10 by 10 television projector which is showing the commercial TV from the prime recovery vessel on the front screen of Mission Control Center. There goes the first astronaut up into the helicopter in the Billy Pugh net.

PAO One crewman aboard, second one will be picked up momentarily as the helicopter lowers the net for the second pickup.

RESCUE 1 Airboss, this is Rescue 1 on 296.8. You copy?

AIRBOSS Rescue, this is Airboss. Roger, I copy, over.

RESCUE 1 Roger, roger.

AIRBOSS Ready for the approach of the second astronaut.

AIRBOSS Astronaut is in the net. Astronaut is halfway up.

PAO Second crewman being hauled up now in the Billy Pugh net toward the Recovery 3 helicopter.

RECOVERY 3 Astronaut is aboard.

AIRBOSS Ready for the approach of the third astronaut. Operation is normal.

AIRBOSS Number 3 is in the raft. ... is in the raft at this time. The third astronaut is climbing aboard.

PAO Third and last crewman is now being hoisted up into the helicopter.

AIRBOSS The third astronaut is aboard Recovery 3.

RECOVERY 3 Tower, this is Recovery 3. ...

TOWER Roger, Recovery 3.

(garble between Tower and Recovery 3 and 2)

PAO This is Apollo Control. A few moments ago Manned Spacecraft Center Flight Operations Director Chris Kraft shouted across the control room to Rear Admiral Fred E. Bakutis, who is commander of Manned Spacecraft Recovery Force, Pacific, Carrier Task Force 130 his congratulations for a job well done in the Princeton recovery area. Recovery Aircraft number 3 now approaching the Princeton. Flight Controllers here in Mission Control gathering ever more tightly here, crowding around looking at the large 10 by 10 television projector at the front of the Mission Control Center as the helicopter lands on the deck of the Princeton, awaiting the crew stepping out of the chopper onto the carrier. On deck at 41 minutes past - 31 minutes past the hour.

APOLLO 10 MISSION COMMENTARY, 5/26/69, CDT 1220, GET 1923120 652/2

I think the boxes of cigars are being broken out here in Mission Control as the helicopter touches down on deck.

END OF TAPE

PAO 31 minutes past the hour. I think the boxes of cigars are being broken out here in Mission Control as the helicopter touches down on deck. NASA Administrator Thomas O. Paine here in the Control Center, as is Manned Spacecraft Center Director Dr. Robert Gilruth. Almost elbow to elbow in here. Cigars are beginning to light up all around the room.

(applause onboard the recovery ship)

PAO Great deal of applause here in Mission Control as the crew steps out of the helicopter; control room is elbow to elbow, from door to door. Cigars have been passed around, I have no estimate on boxes of cigars. On the center screen, 10 by 20 scribing projector, we have a large American flag, 20 feet wide - next to that is the Apollo 10 crew patch on a 10 by 10 projector. Here in Mission Control, they just hung the Apollo 10 patch along with the rest of the manned Apollo mission patches, up next to the ceiling, along one sidewall; there's a large number of American flags on all the consoles, lot of cigar smoke drifting up, everyone is waving their flag for the benefit of commercial TV. Quite noisey in here - now impossible to hear the communication circuits. This is Apollo Control, this Control Center I doubt could hold more than about 3 more people, pandemonium personified; cigars, cameras, flags, people, lot of exhilaration, exuberance here, hand shaking, congratulations going in all directions, various people among the Department of Defense, and the National Aeronautics and Space Administration, after a very successful lunar mission, a predecessor to lunar landing in Apollo 11. At 192 hours, 49 minutes ground elapsed time, this is Apollo Control, signing off.

END OF TAPE