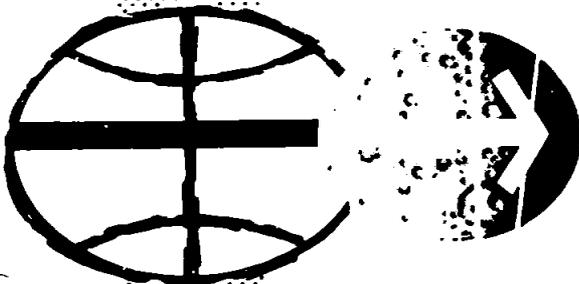




NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Apollo 12 Spacecraft Commentary

November 14 - 24, 1969



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDEXING DATA

DATE

11-24-69

PROJECT

R-12 (12)

SIGNATOR

LOC

12-14

PAO This is Apollo Saturn Launch Control at T minus 1 hour, 48 minutes, 55 seconds and counting. We are still GO with our countdown for Apollo 12 at this time. We are aiming toward our planned T zero of 11:22 AM Eastern Standard Time. The spacecraft commander Astronaut Pete Conrad still busy aboard the Apollo 12 spacecraft, going through the final checks of the various modes of the emergency detection system of the space vehicle. The other astronauts are keeping an eye on activities inside the cabin as we continue our purge and leak checks. That is bringing the cabin atmosphere to the 60-40 oxygen nitrogen atmosphere that we desire for liftoff. The astronauts are breathing of course 100 percent oxygen through their suit circuits. Our countdown picked up at T minus 9 hour mark at 1:22 AM Eastern Standard Time this morning and we then preceded here in the firing room to begin the final propellant loading of the Saturn 5 Launch vehicle. As it stood on the pad at that time, it already had its RP1 fuel aboard the first stage. However, we spent 4 and a half hours or so bringing in more than three quarters of a million gallons of the cryogenic propellants the liquid oxygen and liquid hydrogen. We started loading oxygen to all three stages from the top down, and then went into the final phase of propellant loading bringing the hydrogen fuel first aboard the second stage and finally aboard the SIVB, or third stage. All of this work was accomplished by the time we went into our planned built in hold at T minus 3 hours, and 30 minutes. As far as the prime crew is concerned, after a good 8 hours of sleep, they were awakened in the crew quarters by Astronaut, Chief of the Astronaut Office, Tom Stafford, at 6:05 AM Eastern this morning. The crew then went down the hall to take their customary brief medical exam on launch morning; they were examined by doctors Alan C. Harder and John T. Teegan. Following the brief examination Dr. Harder declared the astronauts were in great shape and everything is normal. The crew then received a weather briefing from Tom Stafford; his briefing still stands at this time as far as the weather forecast is concerned. The astronauts were told that they would expect the following conditions at launch time; scattered clouds in the Cape Kennedy area of about 2500 feet, a broken ceiling at about 10 000 feet, we would have winds from the southwest about 15 knots with gusts to 25 knots, a temperature in the launch area of 67 degrees. All of these conditions are acceptable for a launch attempt. Weather on the round the world track in some places a little rough; in the Western Atlantic, particularly, we have 7 foot seas, and winds up to 25 knots. However, looking at all the abort contingency areas, weather is acceptable in those areas also, for a flight attempt this morning. The astronauts sat down to the normal breakfast menu

PAO of steak, eggs, orange juice, coffee and toast. They had 5 guests for breakfast. The guests included Tom Stafford, the backup lunar module pilot, Astronaut Jim Erwin, Jim McDivitt, who is the Apollo Program Manager for the Manned Spacecraft Center, Astronaut Paul Weitz is the Support Lunar Module Pilot for the Apollo 12 mission, and also sits in as the capsule communicator with the call sign "Stoney" here in the firing room. The 5th man to join the group was Mr. Chuck Tringali, Mr. Tringali is head of the support training group for the Apollo 12 crew. A 6th individual in the room was a life size gorilla from what we understand - a stuffed gorilla - that was sent to Pete Conrad by one of his friends. This gorilla had been adopted as a mascot by the crew and he was rigged up in a flight smock and crash helmet. He was seated on the side in the breakfast room when the crew came in. The crew then departed the quarters after donning and checking out their space suits at the appointed time, 8:10 AM Eastern Standard Time, and preceded to the launch pad, up to the 310 foot level where in order, they boarded the spacecraft as follows: First the Commander Pete Conrad, who sits in the left hand seat, followed about 6 minutes later by Astronaut Alan Bean, the Lunar Module Pilot, the right hand seat, and another 7 minutes went by and then Dick Gordon, the final member of the crew was aboard, Dick Gordon is the Command Module Pilot who sits in the middle seat. The hatch was then closed, and the countdown is preceding satisfactorily since that time. We are 1 hour, 44 minutes and counting. This is Kennedy Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, T-1:38:55 2/1

CAPCOM This is Apollo Saturn Launch Control. T-1 hour 38 minutes, 55 seconds and counting. Countdown is still progressing satisfactorily at this time. We've completed that rather extensive emergency detection system check with astronaut Pete Conrad working the various checkouts with the Launch Vehicle and Spacecraft crew here at KSC. We've gone through all the various abort modes that could signal trouble to the astronauts on top of the Saturn V, and we are now assured that that system is performing satisfactorily. In the meantime, we have completed the purge of the spacecraft cabin and have completed our leak checks. We know now that the cabin is on a 60 percent oxygen, 40 percent nitrogen environment that we want for liftoff. Once again, of course, the astronauts inside their suits on the spacecraft suit circuit are breathing 100 percent oxygen, but the cabin atmosphere itself is the 60, 40 combination. All still going well. One hour, 37 minutes, 58 seconds and counting. This is launch control.

END OF TAPE

PAO This is Apollo Saturn launch control T-1 hour, 28 minutes, 55 seconds and counting we are proceeding with the Apollo 12 countdown at this time still aiming at our planned T zero of 11:22 a.m. Eastern Standard Time. AT this point in the countdown the close out crew at the 320 foot level at launch pad A now proceeding to break up the white room area. This is the area at the end of that Apollo access on Number 9. The arm that the astronauts use to go across from the mobile launcher to board their spacecraft a while ago. The space craft hatch has been closed, the cabin is now at its proper atmosphere, the astronauts have completed several vital tests already, one of them being the emergency detection system checks. These were performed by the space craft commander, Astronaut Pete Conrad, working with the launch vehicle and spacecraft teams here at KSC. This was an extensive checkout of the entire detection system that would inform the astronauts of any abort conditions during the powered phase of flight. Pete Conrad now gearing up for a special check that will occur shortly. This is a calibration of what we call the Q ball. It's an angle of attack meter located atop the emergency escape tower which is located, of course, on top of the command module. This angle of attack meter does give readouts to the flight computer during the power phase of flight and Conrad is expected to work adjustments with the launch crew to calibrate that instrument shortly. Our weather conditions still stand. Our forecast is still GO for launch. We expect winds from the southwest getting up to gusts in the area of some 25 knots, a ceiling of about 10 000 feet broken as forecast, however, we are keeping a close eye on this weather front that is in the area. We are GO for launch at this time, however. The astronauts have been up since 6:05 a.m. this morning. They're up now, coming up on about 4 hours and have been working hard in the spacecraft in the final checkouts since they came aboard about 8:30 a.m., a little bit after 8:30 a.m. this morning. Once the checkout crew has completed their work up there on the swing arm we will be ready to bring that swing arm back to a standby position, that is remove it from the spacecraft. This is due to occur according to the procedures at the 43 minute mark in the countdown. All is still going well with our count still a little bit ahead of the time, in fact, on the spacecraft checks as the countdown proceeds for Apollo 12. We are GO at 1 hour 26 minutes 16 seconds in counting. This is Kennedy Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 9:02 am CST 4/1

PAO This is Apollo/Saturn Launch Control, T minus 1 hour and 19 minutes 55 seconds and counting, still proceeding with the Apollo 12 countdown on time at this time. We are aiming at our projected T zero at 11:22 AM Central Standard Time. Astronaut Pete Conrad, the spacecraft commander, is now working with the spacecraft test conductor, Skip Chauvin in preparation for some guidance and control checks that will be coming up in the spacecraft shortly. This is where Conrad checks out the various systems used to fly the spacecraft in the space environment. He checks out that big engine below them on the service module to make sure that it will regimbal, that is swing in response to commands either from the automatic guidance system aboard the spacecraft or manually by the commander himself if required. He has his translational and rotational hand controllers that he uses in these various maneuvers, and he will be exercising these shortly. We are keeping a close watch now on a weather front that is coming in toward us from the northwest. Launch Operations Manager, Paul Donnelly, just a short time ago did advise Conrad that we are keeping a close eye on it. This weather front does have some heavy rain and a little bit of lightning has been noted. An estimate could be that we might get it in this area about noon time. Launch Operations Manager Donnelly informed Pete Conrad we hope to have them off in time and in time to avoid any difficulties with weather. Our forecast of a ceiling of 10 000 feet broken still stands for the liftoff time, but we are keeping a close eye at this point. T minus 1 hours 18 minutes 14 seconds and counting, this is Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, T-1:08:55, 9:12 AM

5/1

PAO This is Apollo Saturn Launch Control at T minus 1 hour, 8 minutes and 55 seconds and counting. Still GO with Apollo 12 at this time. The Spacecraft Commander Pete Conrad completing his guidance and control checks, working with the Spacecraft Test Conductor here at KSC. The G & C checks, Guidance and Control Checks of the spacecraft, still appear to be going well at this time. We are keeping a close eye on this weather front that is northwest of us. The forecast now is that there is a very good possibility of having rain in the launch area at launch time. We will continue to keep a close eye on the status of this weather front to determine whether it will interfere with our launch plans. Right now we are still counting and we are still aiming at our planned T zero of 11:22 AM Eastern Standard Time.

END OF TAPE

CAPCOM This is Apollo Saturn Launch Control at 58 minutes, 56 seconds, and counting. We're into the last hour of the Apollo 12 countdown with the exception of that weather front that we're keeping a close eye on. All still going well with the countdown. The crew at the 320 foot level is ready to depart from the white room on call. They've performed all their final checks. In the meantime, here in the firing room we've completed some of the launch vehicle final telemetry checks, and astronaut Pete Conrad still working with spacecraft test conductor Skit Schovan on the final guidance and control checks. These are final refinements. The instrumentation used for that stabilization and control system and the guidance and navigation system that is vital during the time of flight that the astronauts are in space and, of course, in lunar orbit. Our testing is going well. We understand that the rain line on this weather front is probably about 8 miles west of us, and we're just going to keep a close eye on it as the countdown proceeds. In the meantime, the Vice President of the United States now has arrived in the firing room, and we understand the President of the United States, Air Force 1, his aircraft is now in the area, and the President is expected to land shortly. Our countdown still proceeding. We're still aiming toward 11:22 a.m. keeping a close eye over our shoulder to the northwest for that weather front to see whether it will have any effect on our launch attempt here at the opening of the window. We're now at T-57 minutes, 22 seconds and counting. This is Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CST 932 7/1

PAO This is Apollo/Saturn Launch Control. We have just passed the 49 minute mark in our countdown. We are now T minus 48 minutes and 53 seconds and counting. The count is going well, but the weather appears to be deteriorating. However, we are still counting. The front that has been north-west of us appears to be coming in. We'll be standing by. The Launch Director Walt Caprian is getting direct reports on the weather, and if any determination is made it will be announced immediately. In the meantime, we are still counting at this time. Pete Conrad has completed his guidance and control checks in the spacecraft and made some verifications of the entry monitoring system, one of the systems that would be used on reentry either from an abort condition or the normal reentry from their flight to the moon and back some 10 days after liftoff. We'll be keeping a close eye on the weather as the countdown proceeds. Coming up on the 48 minute mark now. We have a report that the President of the United States has arrived aboard Air Force 1 at Patrick Air Force Base, coming off the plane at about 10:29 AM Eastern Standard Time, and is on his way with Mrs. Nixon via helicopter to the Kennedy Space Center. We will be standing by, particularly keeping a close eye on the weather. As far as the count is concerned, the Apollo 12 spacecraft and that Saturn V launch vehicle at Pad A still all going well at this time. 47 minutes 30 seconds and counting, this is Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 9:38 a.m.CST 8/1

PAO This is Apollo Saturn Launch Control. T minus 43 minutes 56 seconds and counting. The launch director still receiving advisories at this time on the weather status. We expect determination to be made shortly on what our plan will be. One possibility will be, if required, to hold the countdown at the 24 minute mark but this exact determination has not been made. Repeat, has not been made at this time. As far as the status of the Apollo 12 astronauts are concerned that determination also will be made if a hold is required whether or not the crew will remain on board. We'll stand by for these decisions and as soon as these are made they will be passed on to you. We are standing by at this time, the count still going at this point and all still well with all technical phases of the count. 43 minutes 6 seconds and counting. This is Kennedy Launch Control.

END OF TAPE

PAO This is Apollo Saturn Launch Control, T minus 38 minutes, 56 seconds and counting. Still proceeding, the countdown clock going at this time. Our weather conditions are just about the same, basically, we are in a touch and go condition, standing by for continuing reports on the progress of this weather front and how it is going to effect us, about 35 minutes from now, or 38 minutes from now, at the T zero time of 11:22 AM Eastern Standard Time. If a hold is necessary, it will be declared, perhaps, about the 24 minute mark, however, we are going to keep an eye on it as the countdown continues. It appears that if we do have to hold for this front, the time element would be such that it is possible the Apollo 12 crew may elect to remain in the spacecraft. Obviously if the front was more severe, with lightning involved, the crew would be removed. No decision has been made on this at this time, and this matter is still up in the air at this time, because the clock is still moving and we are still standing by for further reports. We are 37 minutes, 50 seconds, and counting; this is Launch Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 9:52 am, T-29:54 10/1

CAPCOM This is Apollo Saturn Launch Control. We've just had the 30 minute mark in our countdown. We're now T-29 minutes, 54 seconds and counting. The countdown for Apollo 12 still going at this time. Project officials are still keeping a close eye on this weather front that has moved into the area more rapidly than anticipated earlier this morning. The weather front actually speeded up a little later in the morning. Our determination has been made to continue this countdown at least down to the 10 minute mark in the count. We'll be getting recurring reports on weather conditions as we continue and determinations will be made. We will count at least to the 10 minute mark and either hold at that point, or if conditions are such, continue still aiming toward our planned liftoff at 11:22 a.m. eastern standard time. The Apollo 12 crew of Astronauts Pete Conrad, Dick Gordon, and Allan Bean aboard the Apollo 12 spacecraft up there at the 320 foot level of the pad have been informed of this decision, and they are in accord and our countdown continues. The Apollo access arm swing on number 9 that up to this time has been attached to the spacecraft now has been moved to its standby position some 12 degrees or 6 feet from the spacecraft. In the event that we had an emergency egress situation this swing arm could be brought back rapidly so that the astronauts could depart. Our countdown is continuing at this time, and we are standing by keeping a close watch on weather conditions. T-28 minutes, 25 seconds and counting. This is Kennedy Launch Control.

END OF TAPE

PAO This is Apollo/Saturn Launch Control. We have passed the 24 minute mark in our countdonw, now T minus 23 minutes 53 seconds and counting. Still counting at this time. All aspects of the flight, with the exception of weather, looking very good. We have no problems other than this weather front that is upon us. The countdown continuing, we will count if we can down to the 10 minute mark at least where the final determination will be made. At this time in the spacecraft at the 320 foot level, the command module pilot, astronaut Dick Gordon, sitting in the middle seat, completing some final checks of the reaction control system of the spacecraft. These are those thrusters that are used to enable the spacecraft to maneuver in space. We pressurize the propellants prior to launch to assure that they will work properly when required on the flight to the moon. In the meantime, with the launch vehicle we have made some final checks of the range safety command destruct system. These are the destruct packages aboard the rocket that if the vehicle did fly off trajectory and became a danger to land areas, the vehicle could be destroyed. Of course, this would occur after the astronauts were safely separated from the faulty launch vehicle, using that escape tower atop the vehicle. That escape tower also has been armed at this time. Our countdown still continuing, weather reports still coming in, 22 minutes 30 seconds and counting, this is Kennedy Launch Control.

END OF TAPE

PAO This is Apollo Saturn Launch Control T minus 18 minutes 40 seconds and counting. Countdown still proceeding at this time although it is touch and go at this time we are still not below our minimum margins for launch. The countdown proceeding as reported earlier. We do plan to count down to the 10 minute mark unless we get information prior to that time that would show us we could not go. Out at that spacecraft Commander Pete Conrad still appears to be very cheerful in the spacecraft as he reports back on the settings, the final settings of the stabilization and control system switches. These are the switch panels concerned with the propulsion system that is used in orbit and of course on the way to the moon for spacecraft maneuvers once for Saturn V launch vehicle has placed the spacecraft on its proper trajectory. We are conditioning the tanks of the third stage of the Saturn V launch vehicle with some super cold helium to prepare it for engine ignition which of course would occur during the powered phase of flight. Since that liquid hydrogen fuel must be maintained at 423 degrees below zero we want to introduce a cold atmosphere to the tank itself and the engine chamber so that ignition will be proper when it occurs during the powered flight although we are looking a little bad outside here at the present time. Our countdown is still proceeding. We're giving reports to the astronauts on our status. They are performing their normal functions at this time as the countdown continues. Coming up in several minutes the spacecraft will go on full internal power with the fuel cells. We're now coming up on the 17 minute mark. MARK. T minus 17 minutes and counting on Apollo 12.

END OF TAPE

PAO This is Apollo Saturn Launch Control, at T minus 14 minutes, 16 seconds and counting. We are GO on Apollo 12; we are aiming toward our planned liftoff at 11:22 AM Eastern Standard Time. The countdown will continue; our latest weather advisors are such that conditions are predicted to be acceptable for a launch attempt at 11:22 AM. Although we do have rain in the area, our minimums are acceptable, the top of the weather front is about 23 000 feet, and we have confirmation of very low turbulence concerned with this front. All of these matters related with many other determinations concerned with our mission rules, the Launch Director Walt Kapryan has given a GO to continue the count. The astronauts have been given the word; they are busy in the spacecraft at this time, because the spacecraft has just gone on full internal power with the fuel cells. Up to this time we have been sharing the load of the power of the spacecraft with the external power source. The astronauts also are making their final readouts from the stabilization control system with Pete Conrad reporting back to the Spacecraft Test Conductor Skip Shelburn. The astronauts will arm their rotational hand controllers, those hand controllers that are used to perform the various maneuvers in space as the countdown continues. We'll be coming up shortly with some command signals from Mission Control in Houston, to assure that Houston will be able to send proper commands to the spacecraft once we have liftoff. Our countdown is proceeding; 12 minutes, 42 seconds and counting. This is Kennedy Launch Control.

END OF TAPE

CAPCOM This is Apollo Saturn Launch Control. We've just passed the 9 minute mark in our countdown, T-8 minutes, 54 seconds and counting. Right at this point, Astronaut Tom Stafford here in the firing room is talking with Pete Conrad bringing him up to date on the weather conditions. The weather conditions as reported on the last announcement, that is, we have a top of this weather front of about 23 000 feet, a very low turbulence associated with it. Pete Conrad has just reported back. Sounds good to him. Our count still proceeding at this time as Pete Conrad reports back to Tom Stafford. At this point also, Alan Bean and the Lunar Module Pilot in the right-hand seat has given some up to date readouts on the status of our fuel cells, the power system for the spacecraft, and they've been recorded by the spacecraft checkout personnel. We've taken a look at the lunar module for about 20 minutes. We powered it up at the T-30 minute mark in the count. Powered up all systems with the 4 batteries in the descent stage and the 2 batteries in the ascent stage. The lunar module, of course, which will have the call sign Intrepid when it separates from the command module in flight. Intrepid is go at this time, and we're now powering down the instrumentation. Spacecraft Test Conductor, Skit Schovan, now performing a status check, so are the personnel in the spacecraft control room. All report go at this time, and the spacecraft ready light should be coming up shortly. We are still go at this time, 7 minutes, 30 seconds and counting. This is Kennedy Launch Control. This is Apollo Saturn Launch Control, T-6 minutes, 30 seconds and counting. We're still proceeding satisfactorily with our countdown at this time. The emergency detection system that can warn the astronauts of difficulties during the powered flight now has gone on its automatic sequence. We have power on with the EDS as the countdown continues. The spacecraft ready light is on. The EDS light is on meaning the emergency detection system also is go as the countdown continues. The astronauts now standing by in the spacecraft. Coming up shortly will be some status checks here in the firing room. This is Kennedy Launch Control still go with Apollo 12 at 5 minutes, 52 seconds and counting. This is Apollo Saturn Launch Control, T-5 minutes and counting. At T-5 that swing arm number 9 will now be coming back to its fully retracted position at the pad. Mark the swing arm now moving back from the spacecraft as planned at the 5 minute mark in the count. Just before coming up on the swing arm removal, we went through our final status checks and received a loud and strong go from the Mission Director, Chet Lee, Launch Operations Manager, Paul Donley, and Launch Director Walt Kapryan responding to the request from the test supervisor. The lights now will be coming on

CAPCOM on the abort panels of Astronaut Pete Conrad. These are his cue lights for the 5 engines in the first stage. These 5 lights remain on. When we get proper thrust for liftoff the lights go out informing the spacecraft commander that he has good thrust beneath him. We're coming up now on the 4 minute mark. Pete Conrad reports his lights are on. Spacecraft Test Conductor Skit Schovan has said, "Have a good trip, Pete." Pete reported back, "We appreciate everything everyone has done." Four minutes and counting. Still proceeding at this time. We'll be coming up on our automatic sequence at 3 minutes and 10 seconds in the countdown. We're going through our final astronauts checks at this time as the countdown continues. During these checks just now the Launch Operations Manager Paul Donley said to Pete Conrad, "The launch team wishes you good luck. May the wind be always behind you." Pete Conrad said, "Thank you very much." Count still continuing. Final checks of the guidance and navigation system going on now. Pete Conrad reporting back on their status. We'll be coming up on the automatic sequence in about 10 seconds. From that time on down we are completely automatic leading up to 8.9 - the 8.9 second mark in the count when we get the ignition sequence. MARK firing command, launch sequence start. We have the firing command. We're on automatic sequence. T-3 minutes and counting, T-3. Once the automatic sequence began we've begin pressurizing those big fuel and oxidizer tanks, the overall propellant tanks in the 3 stages of the Saturn V launch vehicle. This will lead us up to 8.9 seconds when the engine ignition sequence begins. The 5 engines in the first stage will ignite building up 7.6 million pounds thrust total. This should occur at the zero mark in the count. We will get verification through the computer that we have proper start thrust, the hold down arms will release, and we'll be off with Apollo 12. Two minutes, 20 seconds and counting at this time. Two minutes. 10 seconds at this time. We see that the stages are now beginning to pressurize as our countdown proceeds. Coming up on the 2 minute mark in the count. T-2 minutes and counting, T-2. Spacecraft commander now has placed the environmental control system of the spacecraft on internal. Up to this time we have been providing external sources for the environmental control system. We're checking the hydraulics of the first stage of the launch vehicle now. We are still go. One minute, 40 seconds and counting at this time. T-90 seconds and counting, T-90, still go. Our status board here in firing room 2 indicates all is still well with the countdown. Third stage tanks now pressurized as the automatic sequence continues. One minute, 15 seconds and counting. Astronaut Alan Bean has just brought the entry batteries on the main power source on the spacecraft. We've conserved those dataries up to

CAPCOM this time. We're coming up on 60 seconds.
MARK T-60 --

END OF TAPE

PAO Mark; T minus 60 seconds and counting. T minus 60. Alan Bean running up the volume on his VHF. 50 seconds and counting. 50. We've now gone internal power with the launch vehicle. We are on the internal batteries in the 3 stages of the Saturn IV. T minus 40 seconds and counting. The spacecraft commander now performing his final function, pressing the button to align the guidance and control system of the spacecraft. Coming up on 30. Mark, T minus 30 seconds and counting. T minus 30. 25 seconds and counting. We are still proceeding. T minus 20. 17 seconds. One arm back; we have guidance internal. 10, 9, 8, ignition sequence start, 6, 5, 4, 3, 2, 1, zero; all engines running; commit; liftoff; we have liftoff, 11:22 AM Eastern Standard Time. Pete Conrad reports the yaw program is IN. Tower clear.

SC A pitch and a roll program and this baby is really going.

CAPCOM Right Pete.

PAO Pete Conrad reporting the pitch and roll program to put Apollo 12 on the proper course. Altitude at one half mile.

SC Roll is complete.

CAPCOM Roger, Pete.

PAO 40 seconds.

CAPCOM Mark; 1 BRAVO.

SC Roger; we got you on that.

PAO Altitude a mile and a half now. Velocity 1 592 feet per second.

SC Got your GDC.

SC Okay, we just lost the platform, gang; I don't know what happened here; we had everything in the world drop out.

CAPCOM Roger.

PAO Plus one.

SC Fuel cell, lights, and AC buss light fuel cell disconnect, AC buss overload, 1 and 2, main buss A and B OUT.

CAPCOM Apollo 12, Houston. Try SCE to auxiliary; over.

SC NCE auxiliary -

CAPCOM SCE. SCE to auxiliary.

PAO comm reports the reading is back.

CAPCOM Mark 1C.

SC 1 Charlie.

PAO Flight Director Jerry Griffin taking a staging status now; Apollo 12 down range 17 miles.

PAO Altitude 20 miles.

SC Touch back. Engines -

CAPCOM Apollo 12, Houston. Try to set your fuel cells now.

PAO Inboard engine out on schedule.
Altitude 33 miles down range. 45 miles.

SC Got a good S2 gang.

CAPCOM Roger. We copy Pete; you're looking good.

PAO Good staging and good thrust on the second stage.

SC We are weeding out our problems here; I don't know what happened; I'm not sure we didn't get hit by lightning.

CAPCOM Your thrust is looking good Pete.

SC Okay, I have a good GDC and A1 has got the fuel cells back ON, and we'll be working on our AC busses.

CAPCOM Right Pete; your fuel cells look good down here.

SC I think we need to do a little more all weather testing.

CAPCOM Amen.

SC Notice the tower gang after we cleared at liftoff (garble)

CAPCOM Good show Pete; you're in mode 2.

PAO Launch escape tower has been jettisoned on schedule. And we confirm the engines for separation also. Down range 122 miles; altitude 61 miles; velocity 10 000 feet per second.

SC We've got an ISS light on and we have a cycling CO2 partial pressure high, which I don't - bother me particularly, and we have reset all the fuel cells, we have all the busses back on the line, and we are just square up the platform when we get into orbit.

CAPCOM Roger, Pete. That sounds good.

SC Hey, that's one of the better sims, believe me.

CAPCOM We've had a couple of cardiac arrests down here too, Pete.

SC There wasn't any time for that up here. We've got a good clock running here, and correct me, I'm going to give you a mark at 4 plus 30; I've lost my event timer. And - mark, 4 plus 30.

CAPCOM Looks good Pete.

SC Okay. We're all organized again Jack. The only thing we've lost now is the ISS, number 1 ball is just drifting all over the place; we'll have to catch it later.

CAPCOM Roger Dick.

SC Try and have the G & C guys think about how we're going to get that thing, cause it's just drifting; just floating.

CAPCOM Okay, we're thinking.

PAO The trajectory is right down the lines on the plot board. Altitude is 85 miles now.

CAPCOM Houston. We won't be sending you an SIVB to COI call.

SC Okay, understand. And can you give us the good words like lets get that DSKY - I mean the IMU calmed down; it's rolling all over the place.

CAPCOM Okay Pete. And if you do a mode 4, it'll be on the backup.

SC Yeah, no sweat. I got a good SCS.

CAPCOM Okay, good show.

SC I got a little vibration of some kind - she's chugging along here, minding her own business, though.

CAPCOM Okay, Pete.

PAO Velocity is 13 500 feet per second now. Altitude 92 miles; Apollo 12 down range 345 miles.

SC (garble)

CAPCOM Roger, 12.

CAPCOM Apollo 12, Houston. Level sense arm 8 plus 37; cutoff 9 plus 11.

SC Okay, here comes the gimbal motor.

PAO The level sense arm initiates the staging sequence that will be at 8 minutes, 37 seconds. We are in 6:25 now.

CAPCOM Mark; SIVB to orbit.

SC SIVB to orbit.

PAO The SIVB now has the capability to put the Apollo 12 spacecraft into orbit should something happen to the second stage.

CAPCOM Apollo 12, Houston. You're right smack dab on the trajectory, your IU is doing a beautiful job.

SC Okay, we're all chuckling up here over the lights; we all said there were so many on we couldn't read them.

PAO Down range 557 miles now.

CAPCOM 12; Houston. Give us OMNI DELTA.

SC Roger; going to OMNI DELTA.

PAO Altitude 100 miles. Velocity 18 417 feet per second.

SC Center engine.

PAO Center engine out on schedule.

CAPCOM Apollo 12, Houston. We can start getting that platform squared away. Go IMU power standby and then back to ON and we'll get her caged up.

SC We'll wait till we get through staging here I think Houston.

CAPCOM Okay, soon as you can reach it; that's the way to go.

CAPCOM Apollo 12, Houston. GO for staging.
 SC Roger, we are GO for staging.
 SC Okay, you want the LMP to turn on the G&N power and then bring it back on and you want me to use my IMU cage switch, is that right?
 CAPCOM Stand by on that Pete.
 PAO Second stage engine shutdown is predicted for 9 minutes, 11 seconds. We are at 9 minutes now.
 SC Got a good SIVB; nice smooth staging.
 CAPCOM Roger Pete; your thrust looks good.
 SC Okay; give us some more words on the IMU now.
 PAO Velocity is 23 000 feet per second. Down range 967 miles. Altitude 102 miles.
 CAPCOM Standby a minute Pete; we're still talking.
 SC Okay.
 PAO Good trajectory; good thrust.
 CAPCOM Mark; mode 4.
 SC Roger; mode 4.
 PAO Mode 4. Apollo 12 could get into orbit now using the Service Propulsion System. Down range 1 160 miles, velocity is 24 157 feet per second, altitude 103 miles.
 SC Well I'll tell you one thing; it's a first class ride Houston.
 CAPCOM Kind of a rough start.
 SC Yeah. I always like to start out behind the 8 ball and get ahead.
 PAO Estimating cutoff at 11 minutes, 35 seconds.
 CAPCOM 11 plus 35.
 SC 11 plus 35. Roger. Roger.
 SC Shutdown. 11 plus 33, Houston.
 CAPCOM Roger Pete.
 PAO Flight Dynamics reported it looks like a good orbit. Showing velocity 25 561 feet per second. Down range 1 450 FIDO Fido says we are GO.
 CAPCOM Apollo 12, Houston. Before you get down there to work on that switch, try pulling on panel 5, your IMU main A and main B breakers.
 SC Okay; that did it. Filled out. Now what do you want us to do?
 CAPCOM Your SIVB safe now; standby.
 SC Okay.
 CAPCOM You've got a GO orbit; you're looking good.
 PAO That's CAPCOM Jerry Carr talking to Pete Conrad.

PAO The backup crew commander Dave Scott
is also at the CAPCOM console here.

CAPCOM 12. Houston. Your SIVB is looking
good; you are configured for orbit.

SC Roger Houston.

CAPCOM Roger 12; your orbit is 102.5 by
100.

SC At least that didn't lose it.

SC Houston, be advised that I am re-
setting on the stabilization and control system logic buss A
3 dash 4B, which was out, for some reason.

CAPCOM Roger Pete; we copy. Also on your
IMU main A and B breakers, let's leave them up for at least
3 minutes.

SC Okay, and then want do you want us
to do; reset them and come up with a P51 when we get into the
darkness?

CAPCOM That looks like the right plan Pete;
we are still talking; we'll give you a final on that.

SC Okay. What do you figure - I think
we got hit by lightning.

CAPCOM 12 Houston. We are about 45 seconds
from LOS; we will pick you up Canaries about 16.

SC Roger. Roger.

END OF TAPE

PAO P51 is a computer program for orientation determination of the IMU, the platform.

CAPCOM 12, Houston. Can you go to P00?

SC Roger, we'll go to P00.

CAPCOM Thank you.

SC We were going into P00 and P00. Now, can we reset the breakers?

CAPCOM That's affirmative, go ahead.

PAO P00 is program zero zero, the idleing position for the computer. We've had loss of signal from the tracking ship Vanguard. We'll pick up Apollo 12 at the Canaries very shortly. We're showing an orbit of 102.5 by 100 nautical miles, a good orbit. Showing weight in orbit 300 253 pounds and an orbital period of 1 hour 28 minutes 14 seconds. Canaries have acquired now.

CAPCOM -- through Canaries. How do you read, babe?

CAPCOM Apollo 12, Houston, through Canaries. How do you read?

SC (garbled) loud and clear.

CAPCOM Roger, you are pretty garbled.

SC Okay, how's that?

CAPCOM Much better, Pete.

SC All righty. I've got a little note for you. I've got a lot of ice on the outside of my number 1 window. I think there was a fair amount of water underneath the DTC that hasn't sublimated yet.

CAPCOM Roger.

SC And we're working on the red check and we have the IMU breakers back in and we're looking at a 000 on the IMU.

CAPCOM Roger.

CAPCOM Apollo 12, Houston. Over.

SC Go ahead.

CAPCOM Roger. We've looked at your REFSMMAT and it's looking good, Pete. You can press with P51 and 2.

SC Okay.

PAO P52 is the realignment for the inertial platform.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. When you do your P51 you're going to wipe out your REFSMMAT. If you'll go P00 and accept, we've got 4 minutes left, we'd like to get you a new uplink of your REFSMMAT.

SC Okay, there's P00 and accept right there.

CAPCOM Okay, Pete, it's on its way.

CAPCOM Pete, your P52 should be in OPTION 1, just a reminder.

SC P52 in OPTION 1, roger. You're going to give us a new REFSMMAT back, is that right?

CAPCOM That's affirmative, Pete.

PAO REFMMAT is a reference matrix for the platform. The flight dynamics says the Canary Station confirms a good orbit with its tracking.

CAPCOM 12, Houston, the load's coming up now.

SC Okay, we're standing by ready to help it over here.

SC Houston, I may have screwed you up there. I hit the reset button.

CAPCOM It's okay. Pete, we're still going.

SC Oakie doakie. Say Houston, (garbled) when to break in on. We're still laughing.

CAPCOM Roger, Pete, we'll tell them. Pete, we're about due to lose you LOS here. AOS at Carnarvon will be 52:15 and we hope to have some word for you by then on what the plan is.

SC Okay, we'll try and have you a good platform by then.

CAPCOM Computer's yours, 12.

CAPCOM 12, Houston, the computer's yours.

CAPCOM Apollo 12, Houston, we'll see you at 52.

SC Roger, see you at 52, Houston.

PAO This is Apollo Control at 24 minutes into the mission. We have had loss of signals at the Canary Island station now. Next station to acquire will be Carnarvon. Tananarive station is no longer in the network. Carnarvon is due to acquire at 52:15 seconds. During this launch, Apollo 12 lost its electrical distribution system, that's AC Bus 1 and 2, speculated due to lightning. We don't have a reason - a definite reason, however, right now. That loss - loss of that threw the fuel cells off the line and this system also powers the inertial measuring unit, the platform. That was lost. We still had the backup guidance system, the stabilization control system which is powered by batteries and not by the fuel cells. The electrical distribution system is now back in operation. The fuel cells are back on the line and on the dark side of this orbit the crew will realign the platform, using the sextant to take star measurement and get the platform back in the proper shape as a reference point.

PAO This is Apollo Control at 26 minutes 31 seconds. We have a voice operated relay recording of the liftoff air to ground. It will not be in real time, but we will play that for you now.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69 10:49 A.M.CST 17/1

SC Ground it will not be in real time, we'll play
that for you now.
CAPCOM Blast off the clocks running.
SC I got a yaw program.
SC Roger, clear the tower. I got a pitch and a
roll program and this baby is really going.
CAPCOM Roger, Pete.
SC That's a lovely liftoff, that's not bad at all.
Roll's complete.
CAPCOM Roger, Pete. MARK, 1, BRAVO.
SC Roger (garble).
CAPCOM Already got your GDC.
SC Okay, we just lost the platform gang. I don't
know what happened here. We had everything in the world
drop out.
CAPCOM Roger.
SC I got 3 fuel cell lights and AC Bus light, fuel
cell disconnect. AC bus overload 1 and 2, main bus A and B
out.
CAPCOM Apollo 12, Houston. Try ECE to auxiliary.
Over.
SC NCE auxiliary.
CAPCOM FCE, FCE to auxiliary. MARK 1, CHARLIE.
SC 1 CHARLIE, Houston, Apollo.
CAPCOM Apollo 12, Houston GO for staging.
SC Some little (garbled)
CAPCOM Apollo 12. Houston. Try to reset your fuel
cells now.
SC Got a good S2 gang.
CAPCOM Roger. We copy Pete. You're looking good.
SC Okay, now we've straightened out our problems
here I don't know what happened. I'm not sure we didn't get
hit by lightning.
CAPCOM Your thrust is looking good Pete.
SC Okay, I have a good GDC and A1 has got the
fuel cells back on and we'll be working on our AC buses.
CAPCOM Right, Pete. Your fuel cells look good down
here.
SC I think we need to do a little more all weather
testing.
CAPCOM Amen.
SC There goes the tower (garble).
CAPCOM Good show, Pete. You're in mode 2.
SC Roger, in Mode 2. No sweat. Okay, we've got
an ISS light on and we've got a cycling CO2 partial pressure
high which I don't bother me particularly a reset all the
fuel cells. We have all the buses back on the line and we'll

SC just square up the platform when we get into orbit.

CAPCOM Roger, Pete. That sounds good.

SC Hey, that's one of the better sims believe me.

CAPCOM We've had a couple of cardiac arrests down here too, Pete.

SC There wasn't any time for that up here. We got a good clock running here and correct me. I'm going to give you a mark at 4 plus 30. I've lost my event timer. And uh MARK 4 and 30.

CAPCOM Looks good Pete.

SC Okay, we're all organized again gang. The only thing we've lost now is the ISS flight number 1 ball. It's just drifting all over the place and we'll have to catch it later.

CAPCOM Roger, Dick.

SC Try to get the GNC guys to think about how we're going to get that think because it's just drifting, it's floating.

CAPCOM Okay, we're thinking. 12, Houston, we won't be sending you an S-IVB to COI call.

SC Okay, understand and can you give us some good words like lets get the DSKY, I mean the IMU calmed down, it's rolling all over the place.

CAPCOM Okay, Pete. If you do a mode 4 it'll be on the backup.

SC Yeah, no sweat, I got a good SCS.

CAPCOM Okay, good show.

SC I got a little vibration of some kind. She's chugging along here minding her on business though.

CAPCOM Okay Pete.

SC Stand by for the gimbal motors, Houston at 6.

CAPCOM Roger, 12. Apollo 12, Houston level sense arm 8 plus 37 cutoff 9 plus 11.

SC Okay, here comes the gimbal motor. MARK S-IVB to orbit.

SC S-IVB to orbit.

CAPCOM Apollo 12, Houston. You're right smack dab on the trajectory, you're IU's doing a beautiful job.

SC Okay, we're all chuckling up here over the lights. We all said there were so many of them we couldn't read them.

CAPCOM 12, Houston. Get us OMNI DELTA.

SC Roger, going to OMNI DELTA. Center engine.

CAPCOM Apollo 12, Houston. We can start getting that

APOLLO 12 MISSION COMMENTARY, 11/14/69 10:49 AM GET 00:27:00 17/3

CAPCOM platform squared away. Go IMU power standby and then back to ON and we'll get it caged up.

SC We'll wait til we get your staging here, I think, Houston.

CAPCOM Okay, as soon as you can reach it, that's the way to go. Apollo 12, Houston. Go for staging.

SC Roger, we're go for staging. Okay you want the LMP to turn off the G&N power and then bring it back on and you want me to use my IMU cage switch, is that right?

CAPCOM Standby on that Pete.

SC Got a good S-IVB. Nice smooth staging.

CAPCOM Roger Pete, you're thrust looks good.

SC Okay, give us some more words on the IMU now.

CAPCOM It's been about a minute Pete, we're still talking.

SC Okay.

CAPCOM MARK, Mode 4.

SC Roger, Mode 4, and I tell you one thing it's a first class ride, Houston.

CAPCOM Kind of a rough start.

SC Yeah, I really think they're starting behind the eight ball and get ahead.

CAPCOM 12, Houston. Cutoff 11 plus 35.

SC 11 plus 35, Roger. Roger. Shutdown 1 plus 33, Houston.

CAPCOM Roger, Pete.

CAPCOM Apollo 12, Houston before you get down there to work on that switch try pulling on panel 5 your IMU MAIN A and MAIN B breakers.

SC Okay that did it. Slow down.

SC Now, what do you want us to do.

CAPCOM You're S-IVB safe now. Standby.

SC Okay.

CAPCOM You've got a GO orbit, you're looking good.

PAO This is Apollo Control at 33 minutes 59 seconds. That's the end of the tape on the liftoff. We'll stand by now on this line for remarks from President Nixon, who is in the firing room at the Kennedy Space Center.

(GARBLED)

END OF TAPE

KSC This is Apollo Launch Control. We're here in firing room 2. The President of the United States and Mrs. Nixon have arrived in the firing room. The President has come right down the middle line, basically right in the middle of firing room 2 mostly at the consoles where the first and second stage personnel are located. The President is walking slowly across the main isle of the firing room shaking hands with all the console operators as he comes by. He has now covered the course of firing room 2. As expected shortly, he'll come up to the rear of the firing room where a microphone is waiting. Accompanying the President and Mrs. Nixon is the Administrator of NASA Thomas Paine. Miss Julie Nixon is in the firing room watching from an observation area to the rear. The President now coming up the steps going to the rear of the firing room. We expect he will be back up on the back row here shortly. We have most of the pilots for the Apollo 13 and 14 missions here. The commanders of those two flights, the Apollo 13 Astronaut Jim Lovell, and Apollo 14 Astronaut Alan Shepard are here in the firing room. The President now coming back up to the rear on management row with Dr. Paine. We expect shortly he will be coming up to the mike. We'll stand by here in the control center. The President is now up on the back row and meeting some of the project officials here. This is Launch Control.

SPEAKER It's a great pleasure and a great privilege to have the President of the United States here with us today. Now Mr. President, the crew down here at Kennedy have asked me to present to you one of the stones from the crawlway, the first 3 miles of the trip to the moon as taken right here at Cape Kennedy. This is one of the stones that the big transporter rolled over on the way out. We'd like you to have that as a memento of this very successful launch today.

NIXON Thank you very much. Dr. Paine and all of you here at Cape Kennedy for this occasion I do want to say that it's been a very great privilege to be here and speaking for Mrs. Nixon and my daughter who are here with me, we think this trip, our trip from Washington to here was definitely worthwhile. When I announced earlier in the week that I was trying to arrange my schedule to come down, there were those that said, "Well, why you can't you see it all on television?" And it is true that I have seen the previous launches on television, but I thought I would share with you the experience of one who has never seen a launch live before and what the difference is, and perhaps if I may use the analogy of sports. I really believe when I like to go to a football game live and feel the crowd there, I really believe that you can sit at home and see a football game on

NIXON television. Probably see it as well or even better than you could see it by being there, because the camera will watch that T formation quarterback and be sure you were watching the ball rather than the face, but - well, that is true in the field of sports of football and baseball. It simply is not true in the case of what we have just seen a few moments ago. Here is the sense of not just the sight and the picture but a feeling, feeling the great experience of all that has gone into it, and I would add to that by saying that coming here and coming to this room brings an extra dimension to this great space launch that we've seen a moment ago. Dr. Paine, Frank Borman, Colonel Stafford and a lot of my friends in this activity have often told me that remember that the three who are up there couldn't be there except for tens of thousands on the ground. Tens of thousands of people who sometimes may seem to be and you may feel you're just numbers and just like these computers that we see in front of you. I do want you to know that I realize that except for what you are doing here they couldn't be there, and they would not make this mission successful. I think that you can be proud of the fact, and we're proud of the fact that every one of our astronauts when they've come to the White House, and I've had the privilege of entertaining several of them. Every one of them make the point that those on the ground, the engineers and the technicians, and the scientists and all of those who work in the program, that they are really the heart of this great successful experience for the American people and for all the people of the world. And finally, I simply want to say that I know there's been a lot of discussion as to what the future of the space program is. As you know, we've been discussing that in the Cabinet and within the Administration. I do think you can be assured that in Dr. Paine and his colleagues you have men who are dedicated to this program who are making the case for it, making the case for it as against other national priorities and making it very effectively. I leaned in the direction of the program before after hearing what they have had to say with regard to our future plan I must say that I lean even more in that direction. Announcements will be made in the future as they have been made in the past as to the commitment of this nation to the program, and I realize that within those in the program, between scientists and engineers and others there are different attitudes as to what the emphasis should be. Whether we should emphasize for more exploration or more in taking the knowledge that we have already acquired and making practical applications of it. All of these matters have been brought to my attention. I can assure every side is getting a hearing. We want to have a balanced program, but most important, we are

NIXON going forward. America, the United States is first in space. We're proud to be first in space. We don't say that in an engenderistic way. We say it because as Americans we want to give the people of this country, in particular our young people the feeling that here is an area that we can concentrate for a positive goal, concentrate and be proud of being America, be proud of what we have accomplished not only for ourselves but for future generations and for the whole world. And in that vein I simply want to say I'm proud of those three men up there. I talked to them on the phone before they left, and I'm just as proud of everybody in this room, and there are thousands across this country that made it possible. You're part of a great organization. The whole nation owes you a debt of gratitude and as President of the United States, I express that debt and acknowledge it today. Thank you.

APPLAUSE

NIXON And here is Mrs. Nixon I think you would like to know that she is the one I'm with today at least. And the girl in - is that purple? - the girl in lilac is Trisha, our daughter. And also, well, of course, he needs no introduction, because he has been to several of these launches as Chairman of the Space Council. We're very happy to have today the Vice President of the United States and Mrs. Agnew. They're over here. We have a few other celebrities here you should know. I don't think I can see them all, but we have Senator Margaret Chase Smith of Maine, a real state. Senator Dery of Florida who told me the weather would be perfect today if I'd just come. We have several Congressmen here, Congressman Brian Spay from - where is he? - over there, yes. Your own congressman from this area. Congressman Boon from Pennsylvania also on the Space Committee. Cheer for them real hard, because they get your appropriations for you. Congressman Burn from that little pocket of poverty, Ft. Lauderdale. And Congressman Bill Kramer - is he here - he must be campaigning, well anyway. And then, I think too you would like to see - we have the science advisor from sunny California, Lee (garbled) over here, the President's science advisor. Well, after being an MC here, I think I'll ask for Johnny Carson's job next week. Thank you very much.

SPEAKER The President is now making his exit from the firing room. He stopped to meet Deke Slayton, Director of Flight Crew Training for NASA. He's now talking to Walter Petrone, the Apollo Program Manager, and Jim McDivitt, the Apollo Program Manager for the Manned Spacecraft Center in Houston. Now shaking hands with Jim McDivitt, the commander of the Apollo 13 mission as he proceeds on his way from here in firing room 2. The President meets Stuart Roosa, one of the pilots on the Apollo 14 mission, and Alan Shepard,

APOLLO 12 PRESIDENT'S MESSAGE, 10:59 am, GET 00:37:00 18/4

SPEAKER is also a commander of the Apollo 14 flight as he makes his way out. The President still talking with the two commanders of the Apollo 13 and 14 missions at this time discussing their preparations. We'll now switch back for operations on Apollo 12.

PAO This is Mission Control, Houston at 51 minutes, 5 seconds. We're just about to acquire at Carnarvon. Acquisition there at 52 minutes, 15 seconds. We'll stand by for conversation through that site. And data is coming through on Apollo 12 from Carnarvon now. No voice contact yet, but we are getting telemetry data.

END OF TAPE

PAO Jerry Carr getting ready to put in a call now.

SC Hello Houston; do you read Apollo 12 through Carnarvon?

CAPCOM Hello Stormy; we're reading you loud and clear.

SC I read you the same. We just finished a P51 with a 4 balls, 1 star angle difference. Dick just did a P52, on stars 14 and 15 with another star angle difference of one; the torquing angles were plus 00755 plus 00941 minus 00366; the time 52 plus 29 and things are back to normal.

CAPCOM Roger, Pete. We copy your data. Your torquing angles plus 00755 plus 00941 minus 00366 at 52:29.

SC That's affirmative, and we are getting on with our GLI checks.

CAPCOM Roger Pete. Would you turn your tape recorder off and set your bit rate at high; we don't have a command - computer at Carnarvon, so you'll have to do it for us.

SC Okay, we just got our program alarm 20430, what ever that is.

CAPCOM Roger, Pete; we'll check it out. 12; Houston. Can you give us a verb 96 enter to stop your integration? And we would like for you to do a E mod dump. Give us a 321 mark when you do your verb 74, and if we get it done now, we should have an answer for you on your erasable memory by the time you get to Guaymas.

SC Okay, verb 74 coming at you.
(garble)

CAPCOM Do a verb 96 first.

CAPCOM 12; Houston. Your program alarm was an integration problem.

SC We saw some illumination out the window; I'd almost be positive that we got hit by lightning someplace.

CAPCOM Roger, Pete. I don't think we got all of that transmission.

SC Okay, I'm just saying, in thinking back to when we had our big blitch, I remember seeing it get light outside the window; we were in the clouds, I'm pretty sure we got hit by lightning.

CAPCOM Roger, copy. Pete, here is our plan. When you finish your E mod dump, then we want to get you up on Honeysuckle and make sure by the way, that you get your S band volume up for Honeysuckle, we want to uplink your state vector at Honeysuckle and then the next dark pass we want you to do a P52 option 3. Over.

SC Okay, we'll do a P52 option 3 on the next dark pass, and that'll give you a drift check, is that right?

CAPCOM That's affirmative, Pete. All the memory we can see so far looks okay, and we should have a real verdict for you at Guaymas after this E mod dump.

SC Okay.

CAPCOM 12, Houston.

SC Go ahead Houston.

CAPCOM We are going to be passing you up some data later on in your checklist, little pieces that you can take out and go through in order to exercise some of your electrical system to give us a chance to see how it all looks.

SC Okay, we are on the time line and we've been exercising fuel cell purges and things like that, and all that seems to be functioning okay.

CAPCOM Okay, Pete; it looks like down here the reason for your IMU problem was strictly a power supply problem.

SC Yeah, we understand that. The voltage on the main busses went down to 24 volts.

CAPCOM Yeah.

SC When we got the fuel cells back on the line; all 3 fuel cells just flat fell off the line.

CAPCOM Roger, Pete, we're going to lose you here in about 30 seconds; we'll pick you up on Honeysuckle on S band only at 59:33.

SC Okay, we got the S band up for Honeysuckle and I was wrong; we are completing the fuel cell purges at this time; you can see the master alarm.

CAPCOM Roger.

CAPCOM 12, Houston; we got your E mod dump.

SC Rog.

CAPCOM Pete, when you hit Honeysuckle, give us POO and ACCEPT.

SC Roger.

PAO This is Apollo Control at 58 minutes, Carnarvon has had LOS. The Honeysuckle Station in Australia will acquire within a couple of minutes. During the Carnarvon pass, Apollo 12 did dump their erasable memory in the computer to the ground; it will be checked here and verified, and we should know by the time Apollo 12 is in acquisition at the Guaymas, Mexico station whether that computer memory is good or not. Over Honeysuckle we will pass them up a new state vector; their position and velocity. We should be picking up at Honeysuckle within a few seconds now. We'll continue to stand by.

PAO The Honeysuckle has acquired Apollo
12.
CAPCOM Apollo 12, Houston through Honeysuckle.
How do you read?
SC Hello Houston; read you loud and clear
on the S band. The computer is POO and ACCEPT and I see another
program alarm, I guess it went back into POO again.
CAPCOM Roger Pete.
SC In this case it's above 96; let me
look at the alarm. Yeah, it's 20430 again; I just - you are
in POO and ACCEPT right now and you can go ahead and take it.
CAPCOM Rog Pete; we got it.
SC Okay, I had just recalled 2, and
started integration again; my fault.

END OF TAPE

CAPCOM Apollo 12, Houston. After we get the state
vector up we'll give you your 66 and your 45.
SC Roger, Roger.
SC Houston, 12.
CAPCOM 12, Houston. Go.
SC We had a normal docking probe extention.
CAPCOM Roger.
CAPCOM Apollo 12, Houston. We're about 20 seconds from
LOS on Honeysuckle. You're going to have to put your bit rate
back down to LOW and tape recorder to forward, and we'll be
picking you up on Guaymas at 1:20, correction 1:28:21.
SC 1:28:21. Roger, roger, and is the computer mine?
CAPCOM Roger, the computer is yours.
PAO This is Apollo Control at 1 hour 5 minutes into
the mission. Apollo 12 has moved out of range of the Honeysuckle
station now, passing out over the Pacific Ocean. Next station
to acquire will be Guaymas, Mexico at an elapsed time of
1 hour 28 minutes 21 seconds. Here in the Mission Control
Center flight controllers are planning extra checks of the
electrical system on Apollo 12. We'll be conducting those
over the United States to make sure there has been no damage
to the electrical system. We have also examining the erasable
memory of the computer. Should have word on that for the
crew by the time they get to the States. The Apollo 12 orbit
changing slightly now as the third stage of the booster, the
S-IVB, vents and as the auxiliary propulsion system of that
stage provides attitude control. Showing an orbit now of
106 by 102 nautical miles, an orbital period of 1 hour 28 minutes
22 seconds, and our weight in orbit is down to 298 999 pounds.
At 1 hour 7 minutes, this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CST 1132 GET 1:10 21/1

PAO This is Apollo Control at 1 hour 10 minutes. We have the crew's heart rates now from Dr. Charles Berry. At liftoff all three crewmen had heart rates of 120. Prior to liftoff they had been running between 80 and 90. Peak heart rates during the powered phase of the flight occurred during that high period of activity and ran between 130 and 140 for all three crewmen. This is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69 11:46AMCST GET 1:24:19 22/1

CAPCOM Okay, we'll try now. This is Launch Control. We'll have a post launch press conference concerned with the countdown of Apollo 12 at 1:30 p.m. at press site 39. 1:30 P.M. is an eyeball time because we want to hold off the press conference until the United States pass of Apollo 12 is completed. When the spacecraft passes the United States and when communications and LOS has occurred, we'll be ready to start that press conference. We're attempting to have it in that period so that it will not interfere with the air-ground commentary that of course is still in progress. So at approximately 1:30 a press conference at press site 39. The participants, Launch Director, Walter Kapyran and Thomas Stafford the chief of the astronaut office. This is launch control.

END OF TAPE

PAO This is Apollo Control at 1 hour 27 minutes. We're about 30 seconds away from acquisition at the Guaymas, Mexico station. Preliminary review of data indicates that problem occurred about 45 seconds after liftoff. Two of the Apollo 11 astronauts were in the Mission Control Center viewing room during liftoff, Neil Armstrong and Buzz Aldrin. We'll stand by now. We have data on the booster coming in from Guaymas. We'll stand by for a call.

CAPCOM Apollo 12, Houston, how do you read?

SC Loud and clear. How me?

CAPCOM Roger, read you loud and clear. We've got a few words for you if you'll stand by for a minute.

SC Okay, I imagine you have.

SC Are you guys going to be ready for the service module RCS hot fire down there, Houston?

CAPCOM We sure will, Pete. We've got some words for you now. Your E MOD dump is still in work. We'll have some answers for you shortly on that. We've got a couple of tests we'd like you to run while you are here over the States. Are you ready to copy?

CAPCOM Apollo 12, Houston. Are you ready to copy?

SC Yes, we're ready to copy. Fire away.

CAPCOM Okay, first thing we'd like to have you do, Pete, is a CMC self check. Go into your operations checklist at page Foxtrot 2-2 and run that little dude, which is a 4 stepper, and on step number 3 do a VERB 21 NOUN 27 enter, and then do a 10 enter rather than a 4 or 5 enter. Over.

SC A CMC self check on page F-20 - 2-2, step 3 VERB 21 NOUN 27 and do a 10 enter.

CAPCOM That's affirmative, Pete, and when you finish that one then we thought we ought to take a look at MCPT check, and your best bet for that is to follow your checklist, page Foxtrot 5-3 and begin where it says "TDC check and affirm".

SC Okay, we just decided that was a good idea ourselves.

CAPCOM Okay, and then go through that till you get to page 5-4 and terminate your test at rote control power norm 2, AC DC. Over.

SC Okay, copy.

CAPCOM Okay, and then to turn your motors off and clean it up you want to skip to Foxtrot 5-6 and on step number 18 there go down to gimbal motors 4 off, and finish off the checklist there.

SC Okay, we copied that and it's all in work right now. While getting those books out and getting ready to do that let me give you a service module RCS hot fire, and just - let me ask you a question here. The service module thrusters wouldn't show up with water and even if they did, it would be long gone and I still have a big block of ice sitting outside my window here, so I hope they don't fire right.

CAPCOM So do we, Pete. Pete, I also have a TLI plus 90 maneuver pad. Whenever you are ready to copy give me a holler.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston.

SC Houston, are you ready for the fire down there?

CAPCOM Roger, 12, also your VERB 96 flag is still set. If you will reselect 2 we can reset that dude.

SC Okay, we're coming at you with the hot fire.

CAPCOM Roger, standing by.

SC I don't think they're firing, Houston.

CAPCOM Apollo 12, Apollo 12, Houston. We saw all the events on telemetry. Over.

SC You say they're firing? We didn't hear a thing.

CAPCOM Apollo 12, Apollo 12, Houston. Affirmative, we saw the events go, but of course we didn't hear anything either.

SC Are you telling me they fired?

CAPCOM Apollo 12, Apollo 12, Houston. Let's try it again, Pete. We have no telemetry on your TCP's. All we have is the electrical indication.

SC Okay, that worked out pretty good.

CAPCOM Apollo 12, Apollo 12, Houston. Roger. We saw your manifold pressures change a little bit, so it does look like they fired. Also, Neil's here and he said he didn't hear his go on MIN IMPULSE either.

SC Okay, but we can see it firing. We're getting some flashes now.

CAPCOM Roger.

CAPCOM Apollo 12, Apollo 12, Houston. Are you ready for the TLI plus 90 pad?

SC We are ready to copy. Go ahead.

CAPCOM Apollo 12, Houston. TLI plus 90 pad follows:
SPS G&N NOUN 47 is 63573. NOUN 48 minus 155 plus 129. NOUN 33
004163577. NOUN 81 minus 04381 plus 00001 plus 50467. Roll,
pitch, and yaw is 179 182 359. NOUN 44 is NA. The DELTA-VT
50656 616 50439.

END OF TAPE

CAPCOM - 5 0 6 5 6. 6 1 6. 5 0 4 3 9.
Sextant, 1 2 0 7 8 2 2 4 1. Bore site 0 2 1. Up 0 9 1. Right
3 3. NOUN 61 plus 0350 minus 02781, EMS 11424 34409. GET of
05G is 0164609. The ullage is none; negative. You are undocked.
P37 for liftoff plus 8, GET is 00800. 6243 plus 166 02543; over.

SC Houston, we are doing a soft check
on the CMC, and we are in the complete dark, and our 3 is 2;
can we terminate that now; we need a NOUN 8.

SC Houston, 12; over.

CAPCOM Roger 12; Houston. Stand by on that.

SC Okay, Houston, and while you're at
it, I would like to bring on the 6 logics for you to get a GO
for pyro arm. please sir.

CAPCOM Roger. You are GO.

SC AC logics 1 and 2 are up and on.

CAPCOM Roger Pete, and you don't need a NOUN
8; must terminate verb 27, correction, verb 21, NOUN 27 enter.
Zero enter.

SC Are you ready for a readback Houston?

CAPCOM Roger; go ahead.

SC Roger. NPS G&N 63573 minus 155 plus
129 004 16 3577 minus 04381 plus 00001 plus 50467 179182359 NA,
NA, 50656 616 504 39 12 0782 241 021 up 091, right 33 plus 0350,
minus 02781 11424 34409 05 G 016 3609, no ullage, undocked, 008
00, 6243 plus 166 02543; over.

CAPCOM Apollo 12, Houston. We sent you a
wrong one on the P 37 for liftoff plus 8. Your longitude should
be minus 166 rather than plus.

SC Roger; copied 166 on the longitude.

CAPCOM Roger 12, and if you will give us
POO and ACCEPT, we'll run your state vector up.

SC Okay, you got it Houston.

CAPCOM Roger.

PAO That was Al Bean with that readback.

On that pad.

SC Houston, this is 12. We are going to
run through this gimbal check if you want to look at it right now.

PAO And that's Dick Gordon.

CAPCOM 12, Houston. Let us get the state vec-
tor first.

SC Okay, you want us to wait for you?

SC Hold it Houston.

CAPCOM Okay, thanks.

CAPCOM Apollo 12, Houston. You can run that
TVC check. Apollo 12, Houston, did you read my last?

SC No, what was that?

CAPCOM You are GO on the NTVC check.

SC Oh, we are in process right now.

CAPCOM Okay.

SC Here come your gimbal motors Houston.

PAO Apollo 12 now checking the thrust vector control, the system for steering during engine burns. They have also done a self check on the command module computer, and have not fired the service module reaction control systems.

CAPCOM Apollo 12, Houston, the computer is yours.

SC Roger.

CAPCOM Apollo 12, Houston. We have checked your E MOD; it's GO.

SC Okay, the gimbal motor check looked pretty good; we're coming back to AC-DC, and going over to step 18 on FI dash 6.

CAPCOM Roger Pete; I've got your TLI pad, if you are ready to copy.

SC Just - let us get the gimbal motors off.

PAO The erasable memory in the command module computer has been verified and it is good.

PAO The TLI plus 90 minutes pad -

SC Houston, we are ready to copy the TLI pad.

CAPCOM Roger, Pete. We are about 2 minutes from LOS, so I'm going to copy - or read up the TLI pad, and you can read it back when we get to AOS at Canaries. TLI pass follows: time base 6 23743. TLI 179059001 burn time 544105154 35420 separation attitude 356092332 extraction 300272028; over.

SC Okay, you want me to read it to you?
Its 23743179059001 -

END OF TAPE

SC Okay, you want me to read it to you. It's
2 37 43 1 79 059 001, burn time is 5 plus 44 105 154 354 20
356 092 332 300 272 028.

CAPCOM Roger, Pete. You're readback's correct. You're
about 1 minute from LOS and you're go for PYRO ARM.

SC Roger to Steve. Go for PYRO ARM and we're
waiting for those golden words that go for TLI.

CAPCOM Rog, we'll give them to you at Carnarvon. You
can expect to pick up the Canaries at 1 50 11.

SC Roger.

CAPCOM This is Apollo Control at 1 hour 49 minutes.
Vanguard has had loss of signal. Canary will acquire within
a minute or so. The TLI plus 90 pad that was passed up a
short while ago is abort information should an abort of this
mission become necessary after the translunar injection burn.
We've also passed up the information for the translunar in-
jection burn. The second burn of the S-IVB, the third stage
of the booster, ignition time 2 hours, 37 minutes, 43 seconds.
Duration of the burn 5 minutes 44 seconds and a Delta V or
added velocity of 10 515 feet per second. We've had acqui-
sition at Canary now. We'll continue to standby.

CAPCOM Apollo 12, Houston. Canaries, how do you read?

CANARIES Loud and clear.

CAPCOM Roger your PIPA bias IRIG drift down here
look real good based on the data that we have right now.
Also the - your theory - and you're idea that it was probably
lightning that did it that looks like about the best theory
right now. With that in mind, the sequence of events is
real explainable. We've got a pretty good idea why it
happened. Everything is looking good here and we see no
reason why you can't just press.

SC We concur. I guess the other thing that we
were thinking about maybe not lightning so much, as just
unstable air. We were a pretty big piece of static electri-
city builder number going through there. We might have just
discharged ourselves.

CAPCOM Pete that - that's exactly the theory that
people are thinking here.

SC Yeah, we sort of glowed all over there when
all the lights came on, I think, I just - still trying to
search my memory because of course when all the lights came
on I got my attention in the cockpit.

CAPCOM Pete, Dave wants to know why you're not watch-
ing what's going on outside.

SC I - I had a pair of eyeballs that were moving
pretty fast about then, in and out.

APOLLO 12 MISSION COMMENTARY 11/14/69 12:10PMCST GET 1:47:10 25/2

CAPCOM You had your scan and high bit rate, huh?
SC You better believe it.
SC Junior could have come over and said that that booster was right down the pike a little faster, Boy.
CAPCOM I wasn't sure soon enough, all right.
SC You said that he didn't hear it.
CAPCOM Apollo 12, Houston. We're 1 minute from LOS. We'll be looking for you at Carnarvon 2 minutes late. It'll be 1 correction 2 25 27.
SC Roger and we're LOS soon as we get into darkness we'll give you another P52 sir.
CAPCOM Roger. Don't forget Option 3, Pete.
SC Roger, roger. Option 3.
CAPCOM So long, 12.
SC (garble) Carnarvon.
CAPCOM This is Apollo Control at 1 hour 55 minutes into the mission. Apollo 12 is over Africa now in its second revolution out of range of the Canary Island station. We have a correction on the ignition time for translunar insertion burn. The time we gave you earlier 2 hours 37 minutes 43 seconds is the time for initiation of time base 6 in the instrument unit of the S-IVB, that's the time base for the translunar injection burn. S-IVB is now in time base 5 which is the orbital time base for the instrument unit. Ignition will come 9 minutes 38 seconds after the start of Time Base 6, so that would put the time for ignition of the TLI burn at 2 hours 47 minutes 21 seconds. Carnarvon will acquire Apollo 12 at 2 hours 25 minutes 27 seconds. This is Mission Control, Houston.'

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CDT 12:33, GET 2:20:10 26/1

PAO This is Apollo Control, and we are in contact with Apollo 12 through Carnarvon. Just a few minutes ago - here's the start of that pass.

END OF TAPE

SC We are off five degrees, we used star 1, star 45; Mr. Gordon is getting better, he had 5 balls and we have a minus 0014 minus 00028 and a plus 00018 and the time is 2 plus 20 plus 2 --

CAPCOM 2 0 -

SC 20. And we had the 0 2 high flow light come on, as advertised, at about 2 plus 21.

SC That time my torquing was 2 hours, 00 minutes, 20 seconds.

SC Yeah, excuse me; got that one wrong. And Houston, if you are not going to use the computer, I'll go ahead and put in the time base 6 program that we have in our easable; just to watch it.

CAPCOM Roger. The computer is all yours, and we copy your torquing angles. Minus 00014 minus 00028 plus 00018 done at 2 plus 00 plus 20 and copy your 0 2 high.

PAO We are back live now.

CAPCOM Apollo 12, Houston. The good word is you are GO for TLI.

SC Hoop-de-doo; we're ready. We didn't expect anything else.

CAPCOM We didn't train for anything else Pete.

SC You better believe it.

SC I'll tell you Jer - we were just wondering if we had trained for that launch either.

PAO That was Dick Gordon.

PAO We have about 2 and a half minutes left in this pass at Carnarvon. We will not acquire Honey-suckle this time, but there are 2 Apollo range instrumented aircraft, acronym ARIA, between Australia and Hawaii; we will have voice communication with Apollo 12 through these aircraft however we will not have telemetry or tracking data at the start of the TLI burn, which will take place between Australia and Hawaii. The ARIA aircraft will be recording the data; they do not have the equipment to transmit in real time back to Houston; we'll pick up telemetry and tracking at Hawaii acquisition about half way through the translunar insertion burn. Ignition time for that burn, 2 hours, 47 minutes, 21 seconds, cutoff at 2 hours, 53 minutes, 5 seconds.

CAPCOM Apollo 12, Houston.

SC Go, Houston.

CAPCOM Roger. We are going to be getting LOS shortly here now; you are going to have to go back to low bit rate and put your tape recorder forward; we got our old buddies ARIA Bravo and ARIA Alpha waiting for you and you will be getting them at 24411, and they will cover you for 6 minutes till we get Hawaii and Hawaii AOS is 2 plus 50 plus 22.

SC 2 plus 50 plus 22. And that's during the burn right?

CAPCOM Roger.

SC Okey-dokey.

END OF TAPE

CAPCOM This is Apollo Control at 2 hours 3 minutes and we've just put in a call to the crew through the ARIA.

SC Apollo 12, Houston through ARIA BRAVO. How do you read?

SC (garble) Houston.

CAPCOM Read you loud and clear Pete.

CAPCOM Apollo 12, Houston through ARIA, Over.

CAPCOM Apollo 12, Houston through ARIA, how do you read?

SC I read you to well Houston and you read up.

CAPCOM Roger, got you now Pete. You're kind of broken though. We're a minute and a half away from the translunar injection burn, ignition at 2 47 21, cutoff at 2 53 05; burn duration of 5 minutes 44 seconds with Delta V or added velocity of 10 515 feet per second. Cutoff where you should have a total velocity of about 35 420 feet per second and Apollo 12 should be at an altitude of about 195 miles at cutoff. We won't have data on this burn until about midway through it when Apollo 12 is acquired by the Hawaii station. We're 30 seconds from ignition. We should have ignition but we haven't heard from the crew yet. Voice communication through the ARIA not too good. Should be 30 seconds into the burn now. Plus 1 minute. Hawaii due to acquire at 2 hours 50 minutes 22 seconds we should get the data then. Plus 130, plus 2 minutes. Coming up on 2 hours 50 minutes elapsed time, we should be acquiring Hawaii in approximately 25 seconds. We have AOS from Hawaii now. Just a first signal no data yet. Brewster says he has no data yet.

CAPCOM Apollo 12 Houston, through Hawaii. How do you read?

SC Out of sight.

PAO We have data and thrust is GO. Burn looks good.

CAPCOM Apollo 12, Houston in the blind, your trajectory and S-IV both look good.

SC Actually they look good in here.

CAPCOM Roger we're reading you weak but clear now Pete.

SC Okay, everything's fixed to go.

CAPCOM Good show.

PAO Flight dynamics says we're right on. Telemetry data shows velocity 31 195 feet per second climbing rapidly. Altitude now 130 nautical miles. We're getting tracking data now in addition to telemetry. Predicted cut off looks nominal guidance reports. Velocity 32 700 -

SC Everything's GO in here.

CAPCOM Roger, Pete. Your cutoff looks nominal. Looks good here.

PAO 33 000 feet per second. Altitude 153 nautical miles.

CAPCOM Knock on the lines Pete.

SC Okay, sir.

PAO We lost the approaching 30

PAO 4 000 feet per second now, and altitude 70 nautical miles. This burn continuing to go extremely well. 35 000 feet per second altitude 187 nautical miles, cutoff.

CAPCOM Now the MS reads plus 10.2 the DSKY reads 35413 plus 05 003 plus 01917.

CAPCOM Roger, Pete. Copy 10.2 on your MS. DSKY is 35413 plus 05003 and plus 01917.

SC Roger.

PAO We were predicting a cutoff velocity of 35 420 feet per second. The onboard reading shows 35 4413 per second. We showed cutoff altitude onboard as 191.7 nautical miles. We had predicted 195 altitude is now 203 nautical miles. Velocity will start to drop of now while altitude continues to climb very rapidly.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger, would you give us all you upheld to accept. We want to close down a valve on your - LOX valve on your 02H2 burner.

SC Okay it's in accept.

PAO Altitude now 403 nautical miles. Velocity is down to 34 426 feet per second.

CAPCOM Apollo 12, Houston. You can go back to block, we've got your valve closed.

SC Okay.

CAPCOM And we're talking at you through Goldstone.

SC Roger.

PAO And the weight bows down to 138 000.

CAPCOM Apollo 12, Houston. Your cutoff looked real good. We'll spend a little time now evaluating your mid-course forehead.

SC Okay. Earth is starting to get nice and round now, can't see it all but we can see a lot of it.

CAPCOM Roger.

PAO That sounded like Al Bean.

CAPCOM Apollo 12, Houston. Your attitude maneuver time is 3 08 04 and it'll be finished at 3 plus 12 plus 04 and we're looking at a separation time of 3 plus 18 plus 04.

SC All right, copy.

END OF TAPE

PAO Altitude now 781 nautical miles, velocity down to 32 824 feet per second. Getting rid of all that propellant in the SIVB has brought the weight down to 138 389 pounds. That's total vehicle weight. We are at 3 hours into the mission now; we passed up a separation time to the crew when they separate from the SIVB at 3 hours, 18 minutes, 4 seconds. Altitude now 1 023 nautical miles, velocity 31 900 feet per second. This is Apollo Control at 3 hours, 6 minutes into the mission. We will continue to stay up live through these next activities, separation coming up in about 12 minutes; crew busy getting ready for that, followed by turn around and the command and service module docking with the lunar module; this activity should be on TV. The flight plan calls for the crew to activate the TV camera at an elapsed time of 3 hours, 28 minutes, with about an hour's TV pass there during and after the docking maneuver to the lunar module and extracting it from the spacecraft lunar module adapter attached to the SIVB stage. We'll continue to stand by for any conversation between the crew and the ground. Altitude now is 1 987 nautical miles, velocity 28 872 feet per second. The booster engineer reports the SIVB has started maneuvering toward the separation attitude. Apollo 12 is 2 222 nautical miles from the earth now; velocity 28 253 feet per second.

END OF TAPE

CACOM Apollo 12, Houston. Give us OMNI Charlie, please.

PAO Booster engineer reports the maneuver to separation attitude is complete. We ask the crew to change OMNI's during this maneuver. We've got intermittent data dropouts as the antenna patterns change. We have DATA back. Distance from earth 2941 nautical miles - 2941 nautical miles, velocity 26 571 feet per second.

SC Hello Houston, Apollo 12. We're on a time line. We'll be SEPING at 3:18.

CAPCOM Roger, Pete. How's the ice situation on your windows now?

SC We've got awful bad windows. It's a shame because it was all the water that was on them and it looks like it'll be with us for the flight.

CAPCOM Bad news, Pete.

SC It's okay. Can't win them all. Maybe I'll get out and clean them later.

PAO Apollo 11 is 3-1/2 minutes away from the separation maneuver. Distance from earth 3218 nautical miles, velocity 25 996 feet per second.

SC Houston. PYRO ON.

CAPCOM Roger, 12.

PAO One minute from separation. Fifteen seconds. We confirm separation.

CAPCOM We copy. SLA SEP, Pete.

SC Okay, we SEPped.

PAO Altitude at separation was about 3800 nautical miles.

PAO Booster engineer reports the S4B stage nice and stable and looking good.

END OF TAPE

SC We can see the whole United States, Houston.
CAPCOM Roger, give us OMNI BRAVO, please.
PAO That was Al, bean reporting he could see the United States. Comand and service modules now maneuvering into the docking attitude.
SC I've got an awful pretty looking Intrepid sitting out the window here, gang. We'll go get her.
CAPCOM Roger.
PAO And Pete Conrad has seen the lunar module, the Intrepid.
CAPCOM Apollo 12, Houston. You are GO for docking.
SC Roger, Houston.
PAO Apollo 12 is in docking attitude now.
PAO Distance from earth now 4500 nautical miles, velocity 23 679 feet per second. And we are set up now in the Control Center to receive TV, scheduled for about 5 minutes from now. We're going to pass up a message on the TV to him I think right now.
CAPCOM Apollo 12, Houston. We are configured for television early if you want to punch it up.
SC Okay, we're punching it up right now.
CAPCOM Good show.
PAO No picture yet, still standing by.
SC How does it look down there, Houston?
CAPCOM Nothing yet, Pete.
PAO This picture is coming in now. It should be converted into color very shortly.
SC How does that look to you, Houston?
CAPCOM Still nothing, 12. Okay, stand by. I think we've got it coming.
CAPCOM 12, Houston, we've got the TV now. It looks very good.
CAPCOM Hello there, Intrepid.
CAPCOM 12, Houston. Black and white is spectacular, and color is really pretty good, too.
CAPCOM Apollo 12, Houston. The camera is cutting off about half of the Intrepid now. At the best we can do for right next to it.
SC (garbled)
PAO Apollo 12 moving in to dock with the lunar module.
SC You're looking right in the LM overhead window right now. (garbled)
CAPCOM Roger, Al, and the color is really great now.
SC This Dick Gordon's smooth as silk.
CAPCOM I think we just saw you grab it.
SC I think we're on the way in right now.
SC We got a hard dock, Houston. She looks good.
Both barber - I mean both A and B are gray. All latches made.
CAPCOM Roger, Pete. Looks good.

CAPCOM 12, Houston. What was that that just floated past the window?

SC I don't really know, Houston. We were in here doing the checklist.

CAPCOM We're seeing some little white flecks floating past the window.

SC We've got a - we're in a great big cloud of ice balls up here. They are just all over everywhere, and there is a lot of stuff floating up out of the S-IVB itself that looks like ice or white paint chips. One of the two.

CAPCOM Roger, we can even see it here.

SC How does the zoom look to you, Houston? Do you want that changed any?

CAPCOM It looks like it is in good position right now.

SC Just a second and we'll slide the camera over to the other side and give you a good earth view.

PAO That was Al Bean.

CAPCOM Apollo 12, Houston. If you're going to leave the camera there for a few minutes more try an f/11 stop.

SC That's where we are now, Houston.

CAPCOM Roger.

END OF TAPE

SC F/11 stop; that's where we are now, Houston.
CAPCOM Roger.
SC I'll try a little more for you.
CAPCOM That is perfect.
CAPCOM We can see the scar marks on the
window now, on the colored TV.
SC Roger.
CAPCOM We can see the red window sill; the
ridge around the window.
SC Okay, we are going to move the
camera now.
SC Roger.
PAO Distance now 6 000 miles from earth.
Velocity 21 694 feet per second. And there is the earth.
CAPCOM 12, Houston. We are picking up
your earth shots now; still moving a little bit.
SC Got you; we'll work on it.
CAPCOM 12, Houston. We've got a real good
view now. Apollo 12, Houston. Were the LM docking lights
on?
SC This is 12; I didn't notice whether
they were on or not, I had my eyes glued to the docking
target.
CAPCOM Roger.
SC Hey Jer - this is Dick. How much
fuel did I waste during that docking?
CAPCOM Hang tight Dick; we'll check.
12, Houston. You were nominal. You used 70 pounds.
SC That's too much; that's too much.
CAPCOM Apollo 12, Houston. We are having
a little trouble recognizing things here; how about giving us
a little travel log?
SC Well, that's the earth you're looking
at, friend.
CAPCOM Oh, I thought it was the moon.
SC Charlie is not working again, is he?
CAPCOM No, we've got him locked in a closet.
SC Okay, you should be looking at the
Yucatan Peninsula, Mexico, Baja, California is in plain sight;
it's a pretty nice day down there; the Gulf - the Western
Gulf of Mexico has a cloud coverage along the coast, looks
like it's almost up to (garble) south and west of it.
CAPCOM Roger.
SC Looks like that garbage we came
through down at the Cape is off the coast at this time.
CAPCOM Gee, you could have waited and
missed it Dick.

SC Ahh, I wouldn't have missed that for the world.

PAO That's Dick Gordon giving the description of the earth.

CAPCOM 12, Houston. Have you got your lens zoomed?

SC That's affirm.

CAPCOM Okay, why don't you try it backing off on it and let us see a little bit more now.

CAPCOM Looks like you zoomed it in closer rather than back that time.

PAO The CAPCOM is Astronaut Jerry Carr. Astronaut Dave Scott, back up commander, still sitting next to Jerry at the console.

CAPCOM Okay, 12, now we can see the earth is indeed round.

SC Hey Jer this is a fantastic sight; the Mississippi Valley has a little bit of cloud coverage coming down from Canada, and there is some in the northeast part of the country, up in the New England states. Looks like they may be getting some snow over there in the next day or two. Florida is cut in half by that front that went through this morning. The West Coast looks absolutely gorgeous; Baja California is clear, looks like the San Diego, Los Angeles area to the south and west of them is a little cloud coverage, covered; I won't say anything about smog.

CAPCOM Roger; do you see any more dry fronts anywhere?

SC That was one of the driest ones I've seen in a long time; I hope I never see another one like it. A look up north; there's nothing but clouds up there. Hey, Houston, they got the (garble) in the tunnel working now; they are talking.

CAPCOM Roger.

PAO Apollo 12 is 7 225 nautical miles from earth now.

CAPCOM Apollo 12, Houston. Now with your zoomer, how about sliding in about halfway between where you are now and where you were before?

SC Okey, doke. Funny; we see the moon out the right window number 5; looks like about one quarter, we see the earth out the left window.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CDT 14:01, GET 3:39:00 33/1

CAPCOM That's good right there.

PAO The crew is pressurizing the lunar module now.

SC Hey, Jerry. I'm going to take the camera out of that left window. I gotta get to work and get this thing pressurized.

CAPCOM Okay, Dick.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. Your signal strength looks a little low. Are you on the high gain?

SC That's affirm. Getting any better, Houston?

CAPCOM Roger, looks good, Al. Looks like the signal strength bumped up pretty well. Apollo 12, Houston. What are your plans for the TV now?

SC We'll get with you in just a few minutes. We're repressuring the LM right now.

CAPCOM Okay.

PAO Apollo 12's distance now is 8 030 nautical miles, velocity 19 594 feet per second. We're at 3 hours, 43 minutes elapsed time into the mission. The crew is busy now pressurizing the lunar module getting it ready to be moved from the adapter in which it was launched. Looks as if they're moving the TV camera around some now.

CAPCOM Apollo 12, Houston. We can see a hand rail there now.

SC Rog, we're back at the LM window. We thought you were probably tired of looking at yourself.

CAPCOM Roger. There's still a little bit of that white stuff floating up, isn't there?

SC Yes, there's quite a bit of it still around us.

END OF TAPE

SC Okay, we're getting a hack on it now, Houston.
 CAPCOM Roger, 12.
 SC We'll go on VOX and let yours.
 SC Hello, Houston, this is 12 on VOX.
 CAPCOM Roger, 12, we're reading you loud and clear on
 VOX.
 SC Hey, I've got Pete working up in the tunnel.
 We've got hatch - hatch is coming down between us.
 SC I've (garbled) something for some reason here.
 SC From this (garbled) over here.
 SC Just a minute. Here it comes.
 SC And Houston, I do notice a sort of funny smell
 people have commented on. It's nothing (garbled) and we
 expected it, but -
 SC Watch your hand controller.
 SC Funny smell to it.
 SC How do the latches look, Pete?
 SC Just a minute. My VOX keeps breaking.
 SC That's affirmative, Pete. You're chopping on
 the VOX.
 SC Yes, how's that now?
 CAPCOM Sounds pretty good now. Keep talking.
 SC Okay. I'm going up in the tunnel at this time.
 SC What did you put it on, about 7 on the legs?
 SC And I don't see any bad latches so far. Looks
 like everything back home.
 SC Are they all parallel?
 SC All parallel. Let me check them all. Just
 a minute. Hello there, and Houston that was a real good ripple
 fire when they went home.
 CAPCOM Roger.
 SC Those - that's all good. Whee, the docking
 probe is hot, but there's the latches, not made, and now it
 is.
 SC Just the handle.
 SC Just bang the handle off. Just shake the
 handle of it.
 SC Okay.
 SC Now go around 1 to 12 and check them all.
 SC Okay.
 SC Al, let's go hook up some warm umbilicals. Let
 me do a 360 up here.
 SC Don't lose him up through the -
 SC No sir.
 SC Probes, just -
 CAPCOM Hey 12, Houston.
 SC Go.
 CAPCOM How about stopping the camera down. There is
 a light spot we're kind of worried about.

SC And that appeared on the last flight.
SC Pete, they mean in the LM. We can
take it out the window if you like, Houston, or turn it off.
SC Verify extend latch engaged indicator red not
vis.
SC Ho, ho, ho. There's one umbilical open.
CAPCOM 12, Houston, you can go ahead and turn it off
if you want to.
SC Look up there. Al Bean is reading something to
you. I don't know what the hell he's reading. Anyway, he's
reading right now.
SC What are you reading, Al?
SC A little (garbled) now.
SC Okay. You've got to put it up to about 7 or 8 -
SC (garbled) under this hatch.
SC Okay. Good boy. Hang on to the hatch.
SC Al, let me go after the other umbilical.
SC I thought you were hanging on to the hatch.
SC I've got it.
SC Are you talking to me?
SC No, I'm getting the other umbilical and we'll
be all set in just a minute. Can you turn on the tunnel
lights?
SC Lots of umbilical here.
SC Oh boy, this is so much nicer than one G
practice. I can't believe it.
SC Okay, now that looks like 2 umbilicals all
connected to me, and let me smoke over these latches one more
time here. I want to check the top of each one of the springs.
They're all good.
SC Okay, one latch, number 11, is a half cock, I
mean a half load. Did you read that, Houston?
CAPCOM Roger, Pete, we read it.
SC Hatch No. 9 is a half.
CAPCOM Number 9.
SC Hatch No. 7 is a half.
CAPCOM Roger.
SC Nothing wrong with that I guess.
SC But all the rest up are full. I guess
before we put the hatch back up there, Dick, we want
to get on the LM power.
CAPCOM Yes, we do. Go - - to 4D.
SC It's on 4-D. I'll reset it.
SC And I'm going to CSM. Okay?
SC I should read aft to 3 2 right where we are,
CSM.
SC We've got power on the CSM, not very much.
I mean on the LM.
SC Let's go half a volt to 3.2.
SC (Garble) 4/10ths.

SC Okay, Houston, you looking at that on your telemetry. That look like we've got everything hooked up?

CAPCOM Looks good, Pete.

SC Okay. Here goes up to 3 volts.

SC Just cycled.

SC Just cycled, huh?

SC Just had a cycle on it.

SC Very good.

SC Hands up to 1.4.

SC Okay. Now it looks to me like we can put the hatch back in.

SC Hand me the old family hatch and I'll stick her back up there.

SC Lets miss those hoses this time and - -

SC I thought the switches would be making this - wait a minute. I'm not in a very good position for you to hand me the hatch yet. Wait. Let me just (garble) remember we are in VOX.

SC Yeah.

SC Okay. Now, I want to get it right. The arrow is in the wrong direction. Rotate my way, gang till you see an arrow and then I'll go on up in here.

SC Which color arrow do you want? There's yellows and reds.

SC The yellow.

SC Yellow's over right at me.

SC All right. Now wait a minute. Let me just cock around here. And there's a hose over on your side that holds this dick. Can you get that clear and I'll go right up into the tunnel with it.

SC Yeah. You ought to go up in the tunnel first, like this.

SC All right. I'm in here - I'm in here.

SC Now turn it. There you have it.

SC All right. Now where's my yellow arrow?

SC There's your red one right here.

SC Yeah. All right. Just a minute. Ho Ho.

Oh, there we go.

SC How you doing with that?

SC The first thing I've got to do here - wait a minute. Unlatch -

SC Go to latch not unlatch.

SC Yeah.

SC Not on that.

SC We'll know just a second.

SC I think everythings in place here. Wait a minute.

SC No. The - be sure and rotate it more. You are
not lined up.

SC All right.

SC Keep rotating it.

SC Okay.

SC There you go. I'll buy that one right there.

SC You'll buy that one right there?

SC Yeah. Let me go to - -

SC Maybe just a little latch?

SC Okay. That looks like it's home. Does that
look like it's home to you?

SC Can only go one time.

SC Looks like it to me. Okay.

SC All right. Let me close the vent valve.

SC Now turn off the lights and we're - -

SC All right. Let's go per the checklist here.
Got the checklist?

SC Where do we - -

SC In my warm little hands.

SC Okay:

SC Says the - -

SC The vent valves closed, handle is latched and
I can verify that all the pieces of -

SC Pressure equalization valve closed clockwise.

SC Vent pressure input take - -

SC LM tunnel vent valve LM, CM DELTA P.

SC LM CM DELTA P?

SC And the tunnel lights are off.

SC And the lights are out. This gage doesn't
read zero. It reads about plus a 10th when we get to
pressure equalized.

SC I see.

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM We need your O2 fans on and we'll watch them
for you and tell you when to turn them off.

SC Okay, sir.

SC I guess the next thing is we want to get the
surge tank and all our repress packages back up.

SC What in the world is all that red stuff back
there?

SC That's just what I was wondering. It's real
pink out there.

SC Yeah.

SC Let me look and see.

SC Houston, 12. What's going on with the booster?

SC All pink out there.

SC Yeah and something just looks like it's
flowing - -
CC Looks like you're getting fuel vent.
SC Huh?
CAPCOM It's a normal fuel vent.
SC Hey, that's pretty spectacular.
SC Aw no. I'll tell you what it is. The sun is
on the - my right side and it's shining around the booster
and it's shining through the fuel vent.
SC Fuel vent - -
SC And it's made a rainbow. It's really
spectacular. Look at it.
SC Yeah.
SC I see the apex of where it all comes together.
SC Yep. Sure can.
SC Look at that. What happened there? The vent
must have shut off or something.
SC Still a little bit on this side.
SC There's all kinds of things going on.
SC Look at all those loose objects floating
along with us down there.
SC Laughter. Take them with us.
SC (Garble) there's a disaster waiting for us
if we don't have those circuit breakers in over there on the
LM set.
SC They're in. I've checked them. Look fine.
SC All right. Let's get back to business. Tunnel
the vent lights off.
SC Okay, you want to go off VOX.
SC Yep.
SC Houston, we're going to leave you off of VOX
for a while. We'll be back with you a little later.
CAPCOM Okay, Dick.
SC And we're standing by here for our - -

END OF TAPE

CAP COM in the box for awhile, and we'll be back with you a little later.

SC Okay, Dick.

SC And we're standing by here for our SEP time. What do you have for us for the SEP time?

CAPCOM Stand by, 12.

CAPCOM 12, Houston. We're looking at a SEP time of 4:13.

SC Roger. SEP time of 4:13.

PAO That's the time the lunar module will be ejected from the spacecraft LM adapter, 4 hours, 13 minutes. We're in elapsed time of 4 hours now, and Apollo 12's distance from earth, 10 730 nautical miles, velocity, 17 520 feet per second.

PAO This is Apollo Control. We will continue to stay up live. The crew has gone off the voice operated circuit mode in which we can hear them talking back and forth to each other, however, we still are in contact with them. We could get conversation between crew and the ground at any time so we'll stay up. We're about 11 minutes away from LM ejection.

SC Houston, we're going to bring the SECS logic on.

CAPCOM Roger, 12, we're all ready.

SC Logic 1, mark; logic 2, mark.

CAPCOM 12, Houston. You're go for PYRO's.

SC Roger. Go for PYRO 1.

PAO We've given Apollo 12 a go to arm the pyrotechnics that will cut loose the attach point of the lunar module and springs will eject the lunar module from the SLA.

CAPCOM Houston. Go for ejection.

SC Roger.

PAO The crew now has a go for ejection of the LM. That's scheduled for 4 hours 13 minutes. We're at 4 hours 9 minutes. Twelve minutes after ejection the S4B will perform an evasive maneuver using its auxiliary propulsion system, about a 10 foot per second maneuver, essentially retrograde. We'll have a slight out-of-plane component to the west.

END OF TAPE

SC Okay, Houston you want us to SEP at 4 plus 13 plus 00, is that correct?

CAPCOM That's affirmative, 12.

SC Houston, this is 12 we're having all kinds of time with this - trouble with this mission timer. We've had to reset that thing twice already.

CAPCOM Yeah, the mission timer in the LEB is okay. It kept good times though we keep getting our little pitch fork and I just think that we're going to have a lot of trouble with it so we're just not going to pay much attention to it.

CAPCOM Roger, Pete. There goes PCMI theory.

SC Say again, Houston.

CAPCOM There goes your EMI theory Pete.

SC Yeah, I'm afraid you're right.

PAO EMI is electromagnetic interference. Apparently -

CAPCOM (garble) Houston.

CAPCOM Okay, we're standing by. (Garble) Houston it looked good and of course you still can't see anything yet and when we pitch around I'll show it to you.

CAPCOM Roger, 12.

CAPCOM Apollo 12, Houston. We don't have our TV ground lines up at this time. If we don't get them up in time to see the pictures we'll record it at Goldstone and show it later.

SC Roger.

PAO That was Al Bean reporting separation on time.

CAPCOM Apollo 12, Houston. We're copying television now and soon as you're finished with your ejection and you're clear we'll go ahead and enable the S-IV B evasive maneuver.

PAO We do have the lines back up and we are getting a picture now.

SC Look at those flashes, Houston. That's the RCS thrusters reflecting off the quads on the LM.

SC Roger.

PAO We're getting a black and white picture but we have not yet gotten color conversion. Haven't seen any flashes yet 12.

SC They may be a little dim for you to see.

CAPCOM Oh, there's the S-IVB and I can see it venting.

CAPCOM Roger. When you're well clear and you're ready for us, let us know and we'll start the maneuver to the evasive attitude.

SC Boy, is that thing venting, what's it keep venting, anyhow, Houston? Keeps throwing out big clouds of

SC of something.

CAPCOM Roger. We're not supposed to be venting anything.

SC Boy, it's throwing stuff off the sides and in the back like crazy.

CAPCOM Roger. Can you get us a picture?

SC We'll get you some on the TV if we can. It just looks like it's venting something out of the rear end. Big radial clouds of it coming out the back.

CAPCOM That's really something.

SC As a matter -

SC Say again, Houston.

CAPCOM We'll let you know when that maneuver's complete. Al, how big is - how far away is that basketball?

SC You probably got a better idea than I do about that one. Could you see that thing throwing stuff out the back, Houston?

CAPCOM We could a while ago and it looks like it's got a halo around it now. Is it still there?

SC Well, that's the sun shining in the front end. But from the angle that we have on it, there's something venting out the - The aft engines are on either side and the upper aft engine, the engine that's away from the -

END OF TAPE

SC The aft stages are on either side and the upper aft engine, the engine that's away from the earth; no, I'm not talking about that, I'm trying to reference it to whatever it is that is sitting back there, it's a line; see that line coming out of the engine? Over on the left hand side?

CAPCOM 12, Houston. We got a hunch that what happened was when that LOX valve failed to open and we tried to close it ourselves, it probably burned out that burner. Maneuver is complete 12.

SC When are you going to make the aps? Oh, hey, it just vented something tremendously; can you see that Houston?

CAPCOM Yeah, we can see it now Pete.

SC Houston, are you going to make that maneuver on time at 11:40?

SC Houston, are you going to make that maneuver on time at 11:40?

CAPCOM 12, Houston. We're looking at 426 plus 18 for that burn.

SC Roger. 426 plus 18. And Houston, that I assume is 11:40 after our sep; is that correct?

CAPCOM We're checking 12.

SC Houston, we're changing the scenery on you; we'll come back to the SIVB just before it goes.

CAPCOM Roger 12, and that maneuver will be done at 13 minutes past sep.

SC Roger; I've got 9:52 right now.

CAPCOM How does the home land look to you?

SC It's beginning to look kind of small.

SC It's really wierd Houston. There is something that is venting radially, and then there is something that is venting along the axial axis - and it is sorta taking turns. Right now it reminds me of some guy standing back there with a water hose just spraying it in any old direction; it's just - it keeps venting, whatever it is, and it just keeps blowing away in different directions.

CAPCOM Roger Pete.

SC I'm trying to get all this on film for you.

CAPCOM Good deal.

CAPCOM 12, Houston, on your event timer; that maneuver will be at 12:48.

SC Okay, understand. 12:48. Okay, Houston, we are going back to the SIVB now for the burn.

CAPCOM Roger 12.

PAO Distance is 14 252 nautical miles from earth, velocity 15 552 feet per second.

CAPCOM We've got the UP-4 now, 12.
SC Roger. Are you starting the SEP maneuver?
CAPCOM That's affirmative. We are ready
now.
SC Okay. We are ready.
CAPCOM Ullage motors are on.
SC Yes, we can see it starting to
move now, Houston. Hear the motors firing?
CAPCOM Roger.
CAPCOM 12, Houston, when you get a chance,
turn off your 02 fans.
SC Roger. They are coming off.
CAPCOM 12, Houston, the APS maneuver is
complete.
SC How much you figure you got out
of that, Houston?
CAPCOM About 10 feet per second.
SC That's preplanned. Did you really
get that?
CAPCOM 12, Houston. The burn was nominal.
If the vehicle is a shade lighter, we might have gotten just
a little bit more DELTA V out of it.
SC Okay. Well, that thing did a
fantastic job for us today.
CAPCOM Sure did.
SC Houston. The sunlight is starting
to come in the window and we are a little concerned about
the TV, so I guess you've seen the show for today on the
S-IVB and we will look at the earth for a little bit for
you.
CAPCOM Roger, Dick, and we sure would
like to see what you guys look like.
SC Well, we look just like we did
when we got out of bed.
SC Now, there's a real reasonable
guy for you.
SC We'll be glad to show you and
give me an attitude to go to. I am not going to track that
S-IVB anymore.
CAPCOM Roger, 12. Your attitude is
ROLL 58, PITCH 240, YAW 390.
SC Roger. Read that S-IVB. It's
starting to get a line on the side and I can still have it
but it is a little tough.
CAPCOM Roger, Dick. This attitude we
just fired to you is your P52 attitude for 05 plus 30. And,

CAPCOM the stars that you can see at this
attitude are No. 12 Rigel - -

END OF TAPE

CAPCOM And the stars that you can use at this attitude are number 12 Rigel, number 16 Procyon, and the reason why we had this one in our hip pocket is that this is the same attitude that you can use for the sextant calibration after you -

SC They say this thing shakes, rattles, and rolls when you fire the thrusters. It's like being on a jerking train.

CAPCOM Roger.

SC Okay, we're at 58 degrees in roll, 240 pitch, and 39 degrees in yaw.

CAPCOM Roger, 12. We're not getting your TV.

SC We get a good picture here on our monitor.

CAPCOM 12, Houston. On the high gain give us pitch minus 50 and yaw plus 60 and that should lock us up. Okay, we got your TV.

PAO Picture coming in.

SC Dr. Gordon - Dr. Gordon, I presume.

SC Better known to his friends as Shicky Dicky.

CAPCOM Hey, Red Baron, where's your scarf?

SC Well, I tell you. I think I forgot it during that boost phase. We ought to talk to you about all that good happening. I'll tell you, it's a terrible way to break Al Bean into space flight. I'll tell you.

CAPCOM Roger.

SC Say, what time is the LOX blow down on the SIVB?

CAPCOM Stand by, 12. 12, Houston. Cris says he doesn't think you guys are the same age as when you got up this morning either.

SC He is absolutely correct.

SC In fact, I wish you guys would play us that DSE tape back tonight. All Al Bean kept saying was there's power on the busses, there's power on the busses, and every light brightly inside was lit. I kept thinking, why is he saying that to me?

CAPCOM Beautiful.

SC I was saying how there is so many lights on, I can't read them all to you. He has totally recovered from launch, see that.

CAPCOM Well, that looks beautiful. That is a nice looking hat you are wearing Al.

SC We have three of them just alike in here.

CAPCOM We have something else for you too.

SC I tell you that command module is a good deal. Dick and I being use to the jets, where you just put everything down and say "hold it." He has 25 things in his hands.

CAPCOM Roger.

SC I am sorry I couldn't follow that SIVB anymore but it was really getting into the sun and I guess we are not

going to see much of it anyway anymore.

CAPCOM Roger, Dick. We would like to have you guys start a battery charge now.

SC Okay. We are going to secure the TV's too. I think we are in Battery B in the flight plan.

CAPCOM That's affirmative.

SC Okay, we are going to store the TV -

CAPCOM Apollo 12, Houston. Sling shot burn time is 4 plus 48 and it is in attitude.

SC Okay, 4 plus 48. We'll - have you got some gimbal angles for us? That are - well, let me ask you. Is it going to be our window in the attitude we are in now or not?

CAPCOM I kind of doubt it Pete. Do you want to watch it go?

SC No, we will just stay put. We are getting hungry and I think we are going to start getting out of these suits and eat in a little bit here.

CAPCOM Roger.

SC Hey Jerry - I am still not too happy with the way this mission event timer is performing even though we do have the tuning fork intermittently in the window.

CAPCOM Roger, Dick.

SC I guess we will just have to keep an eye on it. Right now it seems to be performing okay. We will watch it. I am not so sure that that doesn't get a glitch in it every now and then.

CAPCOM Okay, Dick. And if you are going to lean a lot more heavily on your event timer, you might give us time hacks every once in a while when you are using it and we will set ours up and follow you down here and try to keep giving you the right kind of times.

SC Okay. It looks like the mission event timer in the LEB is keeping good time. Now, let me ask you if also if it was central timing problem. It would also show up with the pitch fork - right?

CAPCOM That's affirmative.

SC We have never seen a pitch fork in the LEB timer and it stayed right in seq all the way along, so we just periodically call it 1665 and update the mission timer. What happened is when a pitch word comes on, it begins to gain time on us. It keeps getting 5 or 6 seconds ahead.

CAPCOM Roger.

PAO The LEB is the lower equipment bay. The mission timer - event timer in that area is working all right - the event timer on the main display panel is not.

PAO The S-IVB sling shot maneuver was scheduled for 4 hours, 48 minutes elapsed time. The present elapsed time is 4 hours, 39 minutes. During this maneuver, the remaining liquid oxygen in the propellant tanks of the S-IVB is dumped. Though the engine bell does provide small amount of energy, it will cause the S-IVB to go around the trailing edge of the moon and then into a solar orbit. This maneuver ensures that the S-IVB does not impact on the moon or have recontact with the Apollo 12 spacecraft.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 4:40:00, 39/1

PAO Apollo 12's distance now at 4 hours 40 minutes is 16 273 nautical miles. Velocity 14 664 feet per second. Total vehicle weight now, 97 157 pounds.

SC Okay, Houston. We've started bat B charge.

CAPCOM Roger, 12.

PAO E com the flight controller monitoring the electrical system reports that the battery charge does look good. Astronaut Buzz Aldrin has joined Jerry Carr and Dave Scott at the Cap Com console. We're about 30 seconds away from the liquid oxygen dump on the S4B.

CAPCOM 12, Houston. We've initiated the LOX dump.

SC Roger. We'll look for you to go by.

CAPCOM Apollo 12, Houston.

SC Go ahead, Jerry.

CAPCOM Roger, Dick. We've been kind of thinking here a little bit, and we'd like for you to consider a proposal here. It's the idea of getting into the LM tonight before bedtime, and going through the housekeeping portion of your checklist short of the communications, and powering up the CMC and giving us a check and an E mark dump.

SC Yes, that sounds like a good idea. We've been up here talking about what that launch may have done for the LM, and I think we can do that between 2P23. What do you think of that?

CAPCOM We're not going to do MCC 1, Dick. It looks like you won't need it, so you can do that during that time you would normally be doing an MCC 1.

SC Okay. It sounds good. We really don't have any place to go tonight so we don't mind working late.

CAPCOM Okay. It looks like about 11 hours, and we'll work up a good solid plan for you and come up with it later.

SC Okay and if that was a proposal, you'd better watch the use of that language. We won't accept those sort of things.

CAPCOM Roger. Should I have said this was a proposition for you?

SC No, you said proposal, sir.

END OF TAPE

SC Say, Houston, 12.
CAPCOM Go ahead, 12.

SC Our compliments to the chef.
CAPCOM Roger. He'll be glad to hear that.
CAPCOM Did you break out the jelly beans yet?
SC No, we're still reminiscing about that launch.
SC We was wondering we were supposed to try
SCE to OX. We haven't figured that one out yet.
CAPCOM Well, the reason why is because we lost all
of our telemetry.
SC Lost all your what?
CAPCOM Telemetry.
CAPCOM 12, Houston. When you went under voltage there,
you lost the SCE and we had to go OX in order to see what
happened.
PAO SCE is the signal conditioning equipment.
At 5 hours 1 minute, Apollo 12 is 18 827 nautical miles from
Earth. Velocity 13 706 nautical miles. And the crew is
having its meal. Eating some ham sandwiches. We'll take
this release circuit down now for a while and come back up
if there's further air-ground. This is Mission Control,
Houston, 5 hours 1 minute.

PAO This is Apollo Control at 5 hours, 5 minutes. We've had a brief bit of conversation with the Apollo 12 crew and we will play that for you now.

SC Hello, Houston, this is 12.

CAPCOM Go, 12.

SC Roger. Can you explain what is going on with our COMM? We just lost you there and we had a little trouble.

CAPCOM Roger. We just handed it over Goldstone to Ascension.

SC Roger. Now, I understand. What did you say about the SCE to AUX as supporting in that launch?

CAPCOM Roger. The reason - what happened here is we lost that dude when we went low on that BUS, so we had to have you go to AUX in order to pick it up again.

CAPCOM 12, Houston. The words are almost all of your electrical parameter comes down on that SCE and so when you go low on the BUS like that and dump it, about the only thing we can do is go to AUX and try to pick it up again.

SC Okay. I understand.

PAO This is Apollo Control at 5 hours and 7 minutes. We are back alive now with air-to-ground. Apollo 12 is 29 645 nautical miles from earth, velocity is 13 443 feet per second.

PAO This is Apollo Control. The word "AUX" that you have heard in the last few transmissions is AUX and stands for Auxiliary.

END OF TAPE

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Roger. If you'll give us P00 and accept, we'll fire up some - a new REFSMMAT a zero trunion bias and a CMC clock update. Over.

SC Roger. It's all yours.

CAPCOM Roger.

PAO This is Apollo control at 5 hours 23 minutes. Apollo 12's distance from Earth is 21 475 nautical miles. Velocity 12 883 feet per second.

END OF TAPE

SC Hey, Houston, 12.
CAPCOM Go ahead, 12.
SC Roger. Doing the P23 at 6 hours, you gave me this attitude after we left the SIV-B but the flight plan has star 15 for the optics, Cal. 204 2620. Are you going to change that?
CAPCOM Dick, you'll have a new REFSMAT at that time and your inertial attitude ought to be that now. Once you put in your new REFSMAT, you ought to be in good shape.
SC Ooh, very good, very good. I understand. I was just behind you, I guess.
CAPCOM That's the maneuver we were trying to save you.
SC Thank you.
CAPCOM 12, Houston. The computer's now yours.
SC Okay.
CAPCOM And if you can find the time in your busy social schedule, I got a P37 PAD for you.
SC Okay, just standby, we'll find the book.
CAPCOM Okay, this an LO plus 15, liftoff plus 15.
SC Go ahead with that P37, Houston.
CAPCOM Roger, 12. This is just a four liner. Liftoff plus 15. GET is 015 00 4714 minus 168 05006. Over.
SC Roger. 015 00 4714 minus 168 05006.
CAPCOM Roger, Al.
PAO That was information that would be needed by the crew for an abort at 15 hours after liftoff.
CAPCOM Apollo 12, Houston.
SC Go ahead, Jer.
CAPCOM Roger. What do you say we break the simulation down now and debrief it now and the backup crew's ready to get in.
SC Yes, I imagine they are ready to get in now.
SC You can tell Sim Sup that's a new one to work on.
CAPCOM Roger.
SC It's a good thing we've never seen it before because we sure didn't know what to do about it.
CAPCOM Ooh, you did pretty good.
SC That's right, absolutely nothing.
PAO SIM SUP is the simulation supervisor.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, GET 5:33:00, CST 15:55, 44/1

SC Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC All right. You do have the BTC REFSMMAT in now. Is that correct?

CAPCOM That's affirmative. On that last one, Dick, we sent you PTC REFSMMAT at zero trunnion bias and a CMC clock update.

SC Okay.

SC Hey Houston, this is 12.

CAPCOM 12, Houston. Go ahead.

SC All right. The reason I'm having trouble with this alignment - first star was Canopus. I got that okay in the sextant. The second star in pick-a-pair is Procyon and I don't have anything in the sextant.

CAPCOM Right. Standby, Dick.

PAO Astronaut Ed Gibson is the CapCom now.

SC Houston, CDR. How do you read?

CAPCOM We read you loud and clear, 12. Go ahead.

SC Okay, now this is CDR. I'm on the lightweight headset now. Just checking.

SC He just couldn't see it.

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM We're observing a weak signal down here. We'd like you to go ahead and track - check the position of the track mode switch and also the beam width.

SC We've been operating on OMNIs. Do you want us to go to high gain now?

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 16:10 PM,CST, GET 5:48:00 45/1

S/C And also the width.
S/C We have been operating on OMNI's. Do you
want us to go to high gain now?
CAPCOM That is negative 12.
S/C Roger, we are presently in OMNI A.
PAO At 5 hours, 15 minutes elapsed time, Apollo
12's distance from earth is 24 561 nautical miles, velocity
is 12 062 feet per second.
CAPCOM 12, Houston.
S/C Go ahead.
CAPCOM We recommend that you use star 12 or star 15
for your second star.
S/C Okay.
S/C This time you are looking at the DSKY.
CAPCOM Affirmative 12.
S/C Houston, you are looking at the torquing angles.
CAPCOM We have them 12.
S/C Roger, torquing at this time. Mark.
S/C Hello Houston. 12.
CAPCOM 12 - go ahead.
S/C Roger. How does the flight plan look for this
first set of B23's? Okay?
CAPCOM Stand by Dick.
CAPCOM 12 - go ahead. There are no changes so far.
S/C Okay. We are going to do the VERB - first
maneuver VERB 49 to (garble) sight star.
CAPCOM Roger.
PAO This is Apollo Control at 5 hours, 58 minutes.
We are having a shift change in the Mission Control Center
at this time. We are estimating the change of shift news
conference to begin in approximately 15 minute. Change of
shift news conference in approximately 15 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 16:22 GET 6:00 46/1

PAO This is Apollo Control, Houston at 6 hours 8 minutes now into the flight of Apollo 12. In Mission Control Center Houston, we have just completed a hand-over, change of shift. At this time, Flight Director Pete Frank and his orange team of flight controllers now aboard. As we sit here surveying the room, the Apollo 12 spacecraft the command module Yankee Clipper, the lunar module Intrepid, currently 26 534 nautical miles above the Earth. We now read a velocity of 11 602 feet per second. Spacecraft weight at this time, 97 157 pounds. The atmosphere of the control center somewhat quieter than perhaps it was earlier in the day. Flight Director Pete Frank at this time talking specifically to his ECOM who has just come aboard. And as was recorded earlier, Ed Gibson has replaced Jerry Carr in our CAPCOM position. No conversation from the spacecraft for the past few minutes but we'll standby and continue to monitor at 6 hours and 9 minutes into the flight. This is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69, CST 16:32, GET 6:10 47/1

PAO This is Apollo Control, Houston. At 6 hours, 13 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft's altitude at this time 27 043.8 nautical miles above the earth. Current velocity now reading 11 485 feet per second. We understand the Change of Shift News Conference will start momentarily in the News Center, therefore we will take down the release line from Mission Control for the duration of that conference. At 6 hours, 14 minutes into the flight, this is Apollo Control, Houston signing off for now.

END OF TAPE

PAO This is Apollo control, Houston at 6 hours 37 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft at the present time has a velocity reading of 10 980 feet per second. We currently register now an altitude of 29 549 nautical miles. During that period of time that we had the release line down, we have had some conversation back and forth with the Apollo 12 spacecraft. Principally with Commander Pete Conrad, and we'll play those several minutes of tape for you now.

CAPCOM 12. Go ahead.

SC Roger. Are you copying this speed 23 data?

CAPCOM That's affirmative, Dick.

SC Okay. I was just wondering. You haven't been hollering at me, yet.

CAPCOM It's looking good.

CAPCOM 12, Houston.

SC Go ahead, Houston.

CAPCOM Thanks, 12. We've been thinking about the LM checkout procedures. We'd like your thoughts on whether you want to go in there as soon as you finish up with the P23.

SC Okay. We can do that. We can get in the PTC and then go on in there. What do you got in mind? I guess what I'm asking is what do you people think may (garbled) some breakers out or something.

CAPCOM Pete, that's affirmative. We'd like to go ahead and check the position of several breakers just to make sure that we are getting the heaters coming off and on on all of the systems as we should be.

SC Okay. If you think that's a good idea, and we'll get ready to do that now. I think, what we'd like to do here is - Al is (garbled) like to do, but I still have to spell it. Al is working his way out of his right now while Dick doing this P23 and we want to get Dick unsuited and get everybody cleaned up here, and get this spacecraft stowed. And then we'd like to go in the LM, I think, if we've got plenty of time. Do you agree to that?

CAPCOM 12. That's affirmative. It sounds good. We would like to get into the LM before 8 hours GET.

SC Okay. We'll give her a go. What's your reason for wanting to get in so quick?

CAPCOM Standby, Pete.

SC Old curious Pete. Can you hear me?

CAPCOM 12, Houston.

SC Yes.

CAPCOM Pete, one of the reasons we want to get in that early, is there is a possibility that the ASA heater is not cycling the way it should be. In which case, 8 hours

CAPCOM - is the limit, and we ought to get a look at it before that time.

SC Go ahead, Houston. Standing by.

CAPCOM Pete, I repeat. The reason we'd like to get in there before 8 hours GET, is that the ASA heater may not be cycling, and the thermal limit then is for 8 hours, so we'd like to get in there before 8 hours and check the position of that circuit breaker and make sure that it hasn't popped, and look at the status of the system.

SC Okay. We'll hustle.

CAPCOM Okay, and Pete, we also have the LM checkout procedure that you'll be following for the joint deactivation checklist, and we're ready to read that up to you at any time.

SC You're going to have to hold it for a minute, Houston.

SC Okay, Houston. This is 12 and I'd like to continue this last set of 23's without doing another trunnion bias. Just a half hour right now.

CAPCOM Roger, Dick.

PAO This is Apollo control, Houston. As you heard in that exchange between Cap Com Ed Gibson and Commander Pete Conrad, we are considering having Commander Conrad and Alan Bean, the lunar module pilot, go into the lunar module some time prior to 8 hours ground elapsed time. The ASA or ASA heater referred to there - ASA is an acronym for abort sensor assembly - a part of the abort guidance system of the gyros. So this would be the heaters associated with that system. At 6 hours 43 minutes into the flight, we'll continue to monitor the air-to-ground between capsule communicator Ed Gibson and the Apollo 12 crew. Standingby, this is Apollo control, Houston.

SC Hello, Houston. Apollo 12.

CAPCOM 12, Houston. Go ahead.

SC Roger. Are you going to fix up our state vector?

CAPCOM Standby, Dick. Twelve, we'll have one ready for you in about 10 hours.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 1609, GET 6:47 49/1

SC 12 Houston.

SC Go ahead, Houston.

CAPCOM 12 you can go ahead and hold off on the PTC and enter the LM with your present attitude. We would like you to first, before you go in, check the DELTA P LM CM DELTA P, give us a reading on that and then we have a series of switch and circuit breaker configuration checks, then check the TM and the LGC. We have an abbreviation, or abbreviated procedures taken out of the activation checklist and we're ready to read that up to you, when you're ready to copy.

SC 12, Houston.

SC Go ahead, Houston.

CAPCOM Did you get our last transmission and would you give us a call when you're ready to copy the LM checkout steps?

SC Rog. You're going to have to give us a few minutes. We're still reconfigured getting out of our suits up here yet.

CAPCOM Okay; thanks Dick.

PAO That was Dick Gordon, identifying to Capsule Communicator Ed Gibson that the 12 crew is now getting out of their spacesuits. At the present time we read a velocity of 10 701 feet per second, an altitude of 31 013.4 nautical miles. At 6 hours, 52 minutes into the mission of Apollo 12, we will continue to monitor the air to ground loop.

SC Houston, Apollo 12.

CAPCOM 12, Houston.

SC Roger, we're ready to copy those instructions you've got about the activities you want us to perform in the LM.

CAPCOM Roger, I only follow. First, before you go in we'd like you to read us down the DELTA P from the LM Command Module and then the - -

END OF TAPE

CAPCOM Before going, we'd like you to read us down the DELTA P from the LM and command module and then the abbreviated procedures to go through on the activation checklist are as follows. The activation 1, steps 1 2 3. Activation 2, step 2 and activation 3 through activation 9, perform ALL. On activation 10, steps through 18. Activation 11, steps 1 2 3. Activation 12, through step 4. The COM configuration is as follows: PM prime, prime, OFF PCM, OFF, RESET, OFF, HIGH. (garbled)

CAPCOM On 11, circuit breaker panel 11 LGC DSKY closed. On activation 27, perform CDR steps 3 through 6. Activation 28, through step 7. Then if you'll give us a VERB 74 enter, take a look at the E mod. VERB 37 enter, 06 enter, and a PRO you've got a standby light on. Panel 11 circuit breaker LGC DSKY open. And then continue shutting it down with activation 15, steps 2 3 4 5 and activation 16, perform ALL. That completes it.

SC Okay, let me see if I got it right. First thing you want us to do is read CM-LM DELTA P before we go in. Then we start with activation 1, steps 1 2 3. Activation 2 step 2. Activation 3, ALL. And that's activation 3 4 5 6 7 8 9 all of those. Step - correction activation 10 steps 1 through 18. Activation 11, 1 2 3. 12 1 through 4, COM configuration should be and I may have missed one here. PM prime, prime OFF prime, correction PCM OFF RESET and HIGH.

CAPCOM Al, Houston.

CAPCOM 12, Houston.

SC Yes, Pete. Go ahead.

CAPCOM We just had a brief cutout while we handed over to GOLDSTONE. You did miss one on the COM configuration. The after OFF RESET is OFF and then HIGH. And then continue with your readback.

SC Okay, that'd be OFF RESET and then OFF and then HIGH. Then CB 11 LGC DSKY (garbled) then perform activation 27 CDR steps 3 through 6. Then activation 28 steps 1 through 7 to a VERB 74 enter and a VERB 37 enter 06 enter PRO standby. Lights will come of course. Panel 11, then LGC DSKY open and do activation 15 steps 2 3 4 5 and all of activation 16.

CAPCOM That's correct, Al.

SC Okey doke.

PAO That was Al Bean going through the lunar module checkout procedures with the ground. At 7 hours 1 minute ground elapsed time we'll continue to monitor. We presently show the spacecraft velocity reading at 10 537 feet per second. Our current altitude reading 31 966 nautical miles. This is Apollo Control Houston standing by.

SC Hello, Houston, 12.

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 17:19 GET 6:57 50/2

CAPCOM 12, go ahead.

SC Okay, our DELTA P has fallen off to plus point 4 and the zero reading is actually point 1 so it ought to be - it's fallen off about three tenths. Okay, I'm getting ready to return from the LM now.

CAPCOM Roger, Pete, we copy. Point 4 and point 1 fall off of point 3.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CST 17:29, GET 7:07 51/1

CC 12, Houston.

SC Go ahead.

CC We'd like to precede that LM checkout steps with one step from TLC 1. That is on TLC 1, step 4, carry out the last two lines. Suit isolation both to suit flow, suit isolation both to actuate override.

SC All right. We understand, we'll do it.

PAO This is Apollo Control, Houston 7 hours, 15 minutes now into the flight of Apollo 12. We've had no conversation with the Apollo 12 crew in recent minutes but we thought we would update our altitude and velocity reading from our digital displays. Currently, we show an altitude of 33 282 nautical miles, velocity reading in feet per second, that's 10 309.4 feet per second. At 7 hours, 15 minutes of continuing to monitor of, this is Apollo Control, Houston.

SC Hello Houston. We've got the hatch out and it's probe out, and we're in the process of spilling that and I'm going into the drogue right now.

CAPCOM Roger, Pete. We copy.

PAO That report from Pete Conrad. The hatch is out and the probe is out. We'll stand by continuing to monitor at 7 hours, 18 minutes into the flight.

SC Okay. The TDR's in the LM.

CAPCOM Roger 12. We copy.

CAPCOM And Pete, if you find any circuit breakers which are out of configuration, would you hold up until we get TM before you change them?

SC Roger. Sure will. I'm not going to pass anything up all that Alpha bit here until the activation. First thing we've got the checklist to supply the probe and the drogue down now.

CAPCOM Roger.

PAO That report, Commander Pete Conrad now in the Lunar Module. We're at 7 hours, 21 minutes ground elapsed time. We're now showing an altitude of 33 836 nautical miles. A velocity of 10 215 feet per second. This is Apollo Control, Houston standing by.

END OF TAPE

SC Okay, Houston, Al and I are both
in the LM now and we are getting ready to do your checklist.

CAPCOM Roger. We put both suit isolations
to suit flow and now we are going to turn it to suit dis-
connect.

SC Okay, Houston, we are checking the
breakers now. the ASA (garbled) control panel is in.

CAPCOM Roger, Pete, we copy.

SC The breaker on panel 11 and all
circuit breakers on panel 16 are in proper configuration.

CAPCOM Roger.

PAO This is Apollo Control in Houston.
Al Bean is also in the lunar module at this time. That was
Al who reported things look real tidy.

CAPCOM Hold up on activating the S-Band
until we can get the IU turned off down here.

SC Okay.

CAPCOM Pete, Houston. The explanation
on that utility circuit breaker. At liftoff that circuit
breaker was out and that is the way it was configured at
the Cape. The change did not get into the checklist so there
was no change during flight. We'd like you to go ahead and
leave that circuit breaker out until we can get power on the
LM.

SC Okay. Very good. We are in the
middle of step 11 on act 7 right now.

CAPCOM Roger.

PAO This is Apollo Control, Houston,
7 hours and 31 minutes into the flight of Apollo 12.
Commander Pete Conrad and Allen Bean continuing with their
checkout procedures in the lunar module. Presently, we
show a velocity of 10 055 feet per second for spacedraft
Apollo 12 and an altitude of 34 855 nautical miles above
the earth. At 7 hours and 32 minutes continuing to monitor,
this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 17:54 GET 7:32 53/1

SC Hey, Houston, we're going over on LM power at whatever GET it is right now.

CAPCOM Roger, Pete. Copy your going over.

PAO We presently read a GET of 7 hours 36 minutes That was Commander Conrad identifying he's going over on LM power.

PAO TELMEW confirms that we're presently on LM power.

SC Hey, Houston, this is Apollo 12.

CAPCOM 12, go ahead.

SC Hi, roger. You keep a looking at quad B it's up there at a pretty good temperature 170 degrees now.

CAPCOM Roger, Dick. We'll look at -

SC And okay and if there's no reason why we can't start the PTC unless you want to get this COM stuff I'll just hold here.

CAPCOM All right, standby on that, Dick.

SC Okay, Houston. We're checking the voltages on the batteries now. We got on battery 1 we got 34 volts, battery 2, 34 point 2, battery 3, 34 point 2, battery 4, 34 point 2, battery 5, 37, battery 6 is 37.

CAPCOM Roger, Al we copy 34, 34 2, 34 2, 34 2 and 37 on 5 and 6.

SC Roger. You probably ought give 34 2 to that first one too.

CAPCOM Roger.

PAO That was Al Bean reading off battery voltages to CAP2 communicator Ed Gibson. We're at 7 hours and 39 minutes now ground elapsed time. We presently show velocity of 9948 feet per second. Altitude now reads 35 564 nautical miles. This Apollo Control Houston continuing to monitor.

SC Houston, do you now want us to put ourselves in the COM configuration you were testing?

CAPCOM Pete, that's affirmative.

SC Okay, going on now.

SC Okay, we're set.

CAPCOM Roger.

SC Do you want us to put in the LGC DSKY circulator now Houston or do you want to wait until you get through COM with us?

CAPCOM 12, let's hold up on that right until we see what we have and when you put the LGC asleep, we'd like you to skip program 06 and just pull the LGC circuit breaker that way you'll be in the same configuration you were at launch and the activation that you'll take up subsequently should work out.

SC Okay then we'll just sit tight right now and for your information we're on VHF antenna aft and

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 17:54 GET 7:32 53/2

SC S-band aft.

CAPCOM Roger.

END OF TAPE

SC We're looking out our AOT, Houston. It really looks nice.

SC Houston, are you getting any data from Intrepid, yet?

CAPCOM 12, that's negative. We're still reconfiguring to pick up that data.

SC Oh, okay. We're standing by to come up with the DSKY. We're hoping to get our data.

CAPCOM Okay, Pete.

SC Hey, Houston. I was going to report that I had another person in sight looking out the AOT, but it turns out that the left rear descent looks right in Dick Rogers window and he's looking right back at us.

CAPCOM Roger, Pete. We copy.

SC Say, Houston. How are these going to be reconfigured? We hate to use these batteries up.

CAPCOM Pete, we've got about another minute or two, and if we can't make it by then, we'll not go on with it.

SC What seems to be the problem, Houston?

CAPCOM We're reconfiguring in order to get that data.

SC Jim, we've been planning to do this for quite awhile.

CAPCOM 12, Houston. We're picking up some data from the LM now. Standby. We're looking at it.

SC Okay, Houston. Very good, and say, we've got a favor to ask you for our entertainment tonight.

CAPCOM Roger. Go ahead.

SC You get the DSE tape don't you of the launch?

CAPCOM That's affirmative. We have it.

SC Well, we want you to play it for us tonight before we go to bed. We're still up here laughing over it. Trying to remember all the things that we said and did. We do want to hear it tonight before we go to bed.

CAPCOM You want to relive that twice in one day.

SC Yes. You'd better believe it.

PAO That was Pete Conrad asking the ground if they could replay the tape from this morning's launch. To relive that moment. Seven hours 50 minutes continuing to monitor. This is Apollo control, Houston.

SC Hey, Houston. Are you ready for us for the LC - LGC DSKY breaker?

CAPCOM 12, that's affirmative. We're ready to go.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 18:24 PM CST, GET 7:52:00 55/1

S/C Houston. You want us to bring up the IMU also?

CAPCOM 12. That's negative.

S/C That's two on page activation 27.

CAPCOM That's affirm. That was on activation 27, we have steps 3 through 6.

S/C Roger.

S/C Houston. There is self plim coming at you.

CAPCOM Pete, we are not copying any computer data yet.

S/C Okay. Well, let's do a self check just fine Houston.

CAPCOM Roger. Copy your dump check looked good.

S/C Okay. It is not complete yet but it's in the self check - we've just got a 2 and a 1. We've been running for about 50 seconds.

CAPCOM Roger.

S/C Okay, Houston. The test's completed, the SELF tests satisfactorily. We are going to terminate the self test.

CAPCOM Roger. We picked up and copying your DSKY, and Al, we have been showing high Quad 4 temperature. We would like for you to go ahead and check the position of 2 circuit breakers on panel 11. Heaters RCS system AB1, Quad 4 and on Panel 16 heaters RCS systems AB2, Quad 4.

S/C Roger. All the circuit breakers are out. I guess it is because we haven't gone to PTC yet.

CAPCOM Roger, Al.

S/C Ready for VERB 74?

CAPCOM Could you hold off on Verb 74? We are trying to pick it up on another site.

S/C Roger. We are standing by ready to give you VERB 74.

CAPCOM Al, go ahead with the VERB 74.

S/C Coming at you.

CAPCOM Al, we've got the EMOD.

S/C Understand you got that. That is the End. We are going to pull the DSKY breaker now and power down.

CAPCOM Roger.

S/C We are powering her back down now.

CAPCOM Roger. We copy. You are powering down.

PAO That is Al Bean reporting they are powering down now. Every indication from the check are lunar module, Intrepid, looks good. Eight hours into the flight. Standing by, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, 8 hours and 2 minutes into the flight. We currently show Apollo 12 with a velocity of 9634 feet per second. An altitude of 37 666 nautical miles. Eight hours and 2 minutes into the flight, this is Apollo Control, Houston standing by.

SC Houston, we're going to change to CSM power on now.

CAPCOM Roger out.

SC Houston have you got anything else, work, before we close up the LM?

CAPCOM Stand by on that Pete.

CAPCOM Pete, go ahead and button it up.

SC Houston just check the index circle on the docking here and it's minus 3/10ths.

SC Dick's COAS must have been in error.

CAPCOM Copy minus 3/10ths. Well done.

SC Come on Ed, smile. You sound so serious down there today.

CAPCOM Still thinking about your morning.

SC We're doing our best to forget it (Laughter).

PAO This is Apollo Control, Houston. 8 hours and nine minutes now into the flight. Apollo 12 now shows an altitude reading of 38 311 nautical miles and a velocity reading of 9541.6 feet per second. Continuing to monitor, this is Apollo Control Houston.

SC Okay Houston, the LM hatch is -

CAPCOM Pete, copy you got it closed.

CAPCOM Man, we've got a few things for you to pick up on the timeline, when you're ready.

SC Okay, give us about 10 here until we still get Dick out of his gear and we've got a reconfigure - let's get the probe and drogue back in.

CAPCOM Roger, will do.

PAO You heard that report from Commander Pete Conrad reporting that the LM hatch is closed. Conrad and Bean have returned to the Command Module at this time. Eight hours, 12 minutes continuing to monitor, this is Apollo Control Houston.

SC Houston, the drogue and probe is on its way up this time. Will need about five minutes.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 18:39 GET 8:17 57/1

SC Okay, Houston, we have the tunnel all in and everything's taken care of.

CAPCOM Pete, copy. You got it all buttoned up.

SC Hey, we're looking at you down there, Houston and now you're about the size of a volleyball.

CAPCOM Al, how far away is that volleyball?

SC I'd say that volleyball is about 2 feet away.

CAPCOM Good eye, Al.

SC I can't see any land mass at all. All I can see is water with lots of clouds and I can see sort of a glare pouring on the Earth. I see what must be the zero phase point to us. Other than that, it's very very bright and another interesting thing is on the dark side, you cannot see where the Earth stops and space begins. It's unlike the Moon at night or in the day time where you can see it in Earthshine. You just can't see anything.

CAPCOM Roger, Al. How come the old heads aren't giving us the same description?

SC They're still worried about this morning.

SC He won't let us near the window.

SC We've got a couple of interesting things here now, Houston. I've now started picking up ice on my inner, inside portion of the outside panel on window 1. Don't ask me why.

CAPCOM Okay, Pete, let's hear that one again. The you're picking up ice on the inside of the outside of the panel.

sc No, on the window number 1, the outside window has ice trickles on the inside of it. In other words, between it and the inner window.

CAPCOM Roger, Pete, we got it.

SC They weren't here earlier. I don't know when they arrived. But I just noticed them a little while ago.

PAO That was Pete Conrad reporting the ice between the window panes. Window number 1. Earlier you heard a description from Al Bean as he viewed the Earth from Apollo 12's present altitude of 39 687 nautical miles. We now show a velocity of -

CAPCOM Configuration on activations 3 and 4 except for that utility circuit breaker?

SC That's affirmative.

SC Does the system test meter look okay to you. Why'd you ask, Houston?

PAO Velocity now reads 9349 point 8 feet per second.

CAPCOM Standby, Al.

PAO 8 hours 26 minutes into the flight at this time. This is Apollo Control Houston.

CAPCOM Pete, we show that the current going over to the LM is oscillating as before but it's about 1 amp higher on the MEAN.

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 18:39 GET 8:17 57/2

SC Okay. What's that mean?

CAPCOM Give us another long pause, Pete, and we'll be back up there.

END OF TAPE

SC Hello, Houston, 12.
CAPCOM 12. Houston.
SC Roger. It - I think it's about time
I went to PTV, don't you.
CAPCOM Roger. That's affirmative, Dick. And
now that you're back in out of the LM, and ready to pick
up, why don't I give you some of the things we've been
thinking about as far as a time line. You'll be back on
that nominal time line when take the primary EVAP deactivated
after PTC. And also for PTC, we'd like you to disable quads
Alpha and Rebel.
PAO PTC referred to there -
SC Disable Alpha and Bravo.
PAO PTC referred to there - passive thermal
control or the slow barbeque mode that the command and
service module and lunar module go into in route to the
Moon and from the Moon to stabilize the thermal conditions
outside the spacecraft. We're at 8 hours 30 minutes now
into the flight. We show an altitude on Apollo 12 of
40 159 nautical miles, and a velocity of 9 294.5 feet
per second. This is Apollo control, Houston, continuing
to monitor.
CAPCOM 12, Houston.
SC Go ahead, Houston.
CAPCOM Would you go ahead and turn off hydrogen
tank one heater to get us to do some cryo balancing?
SC Certainly.
CAPCOM Give us a readout of the service module
RCS propellant quantity for all quads?
SC Okay. Hydrogen tank one heater OFF
and 2 is remaining on AUTO. Quad A propellant full scale high.
100 percent. Quad B full scale high. Quad C full scale
high. Quad D full scale high.
CAPCOM Roger. Copy. All full scale high.
MCC Bellcom control.
SC Houston, we're going to go ahead and
maneuver to 090 and set up PTC.
CAPCOM Roger, Dick.
PAO That was Dick Gordon reporting that
they would maneuver to PTC attitude or passive thermal
control attitude. Eight hours 32 minutes now into the
flight. This is Apollo control, Houston.
SC Houston, we have a cryo press 02
tank, tank 2 pressures a little low. It's about 800.
CAPCOM Dick, roger. Copy 800.
SC And is that normal for that particular
tank or is that the one we expected to have trouble with?
Like a warning coming out before the heater?
CAPCOM Standby on that, Dick.

APOLLO 12 MISSION COMMENTARY, 11/14/69, GET 8:27:00, CST 18:49, 58/2

CAPCOM 12. Houston. Had you gone ahead and stirred both tanks? They both look low at the present time.

SC We haven't done anything to them except leave the heaters on. We can give them both a fan cycle if you like.

CAPCOM Standby on that.

CAPCOM 12. Houston. You can go ahead and turn the fans on and bring the pressure up.

SC We've got them both on now, and understand you're going to watch them for us.

CAPCOM Roger. We're looking.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, GET 83700, CST 2859 59/1

SC Hello, Houston, 12.

CAPCOM 12, Houston, go ahead.

SC What's that tank doing? You give us a good pump? Tank 202.

CAPCOM 12, Houston. We are showing on Tank 1, 737, Tank 2 755 and appear to be holding.

SC Say that again, Houston.

CAPCOM 12, we show on Tank 1 737, Tank 2 755.

SC Roger. We are trying to figure out ourselves why (garbled)

CAPCOM 12, give us OMNI alpha, OMNI alpha.

CAPCOM 12, go to OMNI alpha, OMNI alpha.

PAO This is Apollo Control, Houston, 8 hours and 40 minutes into the flight of Apollo 12. That earlier report or exchange that power going into the LM was oscillating as before but showing 1 amp higher.

PAO We are standing by for this.

CAPCOM 12, Houston, go ahead.

SC Houston, this is 12. I just stated that I have acquired alpha if bravo disabled or otherwise forget.

CAPCOM Roger.

CAPCOM Verify that 02 heaters are in AUTO.

SC 02 heaters are in AUTO.

CAPCOM Roger, Al.

PAO Retracing our earlier statement with regard to the 1F higher, this is not viewed with significance in the mission control center at this time. It's possibly a change in calibration, but we can't really tell. At 8 hours, 41 minutes into the flight, we show Apollo 12 with an altitude of 41 129 nautical miles.

CAPCOM Can I have the 02 again. Hand reading Tank 1 758 and 777 Tank 2 it is coming up slow.

SC Okay. we are going to leave our (garbled) until he gets the call in.

CAPCOM Roger. That's a good idea. Looks as though you just have some stratification that is going to take a little while to fix it up.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, 19:09 PM CST, GET 8:47:00 60/1

CAPCOM 12. Houston.
S/C Go ahead.
CAPCOM Your PITCH and YAW rates look low. You can
go ahead and start the ROLL.
S/C You say our PITCH and YAW looks pretty good,
huh?
CAPCOM That's affirm.
S/C We have only been waiting about 10 minutes.
CAPCOM Dick, it looks good down here. We are ready
to go.
S/C I am with you. I am just saying that is only
took 10 minutes.
S/C Hello Houston. 12.
CAPCOM 12, Houston. Go ahead.
S/C Rog. We are still venting this cabin overboard.
WE think we should have terminated about 8 hours. Shall we
go ahead and terminate the cabin purge?
CAPCOM Dick, we show that we ought to go on with that
until about 12 hours.
S/C Affirmative.
CAPCOM 12. Houston.
S/C Go ahead Houston.
CAP Pete, we would like for you to take the S-band
antenna to the OMNI and go to the BRAVO position.
S/C Okay. S-band OMNI to BRAVO.
S/C Houston. 12
CAPCOM 12. Houston. Go ahead.
S/C Roger. Let us know when you think we can
deactivate the evaporator.
CAPCOM Roger, Dick. Will do.
S/C Thank you.
CAPCOM Dick, you can go ahead and deactivate that
now.
S/C Okay.
S/C Hello Houston. This is 12 and we are about
to change lithium hydroxide cannister number 1.
CAPCOM Roger, Dick. We copy.
S/C Okay, Houston. The evaporator is secured.
CAPCOM Roger, 12. Copy. The evaporator is secured.
PAO This is Apollo Control, Houston, at 9 hours,
1 minute now into the flight of Apollo 12. We currently
show an altitude of 42, 763.7 nautical miles and a velocity
now reading 8966 feet per second. Since the conversational
pace has slowed considerably in this phase of the mission,
we do plan to take the live release line down and tape, if
for a periodic playback. However, if conversation does pick
up, we will bring the line back up again. At 9 hours, 2 minutes

APOLLO 12 MISSION COMMENTARY, 11/14/69, 19:09 PM CST, GET 8:47:00 60/2

PAO into the flight, as you heard reported from the
spacecraft by Dick Gordon, the first cannister change has been
made and it's expected that the crew will take some time for an
eat period. This is Apollo Control, Houston.

END OF TAPE

CAPCOM 12, Houston.

SC Go ahead, Houston.

CAPCOM We have some folks back here interested in your comments about the vibration there in the S-II burn. Could you quickly give us a few terrifying remarks on that?

SC It just seemed to be it vibrated all the way through the S-II burn, that I could see. Let me ask the other guys. Yes, it's just a small low amplitude vibration. You know, just a little shaking all the time, throughout the whole burn.

CAPCOM Roger. Do you have any feel for the direction in the frequency?

SC No, it wasn't longitudinal. A couple of CPS really, I guess.

CAPCOM Roger, Pete.

SC Can you see it on the records down there? Anything?

CAPCOM Pete, we don't have - the folks here are looking at the records right now.

SC Okay; I understand.

PAO This is Apollo Control, Houston, 9 hours and 6 minutes into the flight. You heard Pete Conrad reflecting on the powdered phase of flight specifically the second stage of part of the boost phase with Ed Gibson on the ground. At 9 hours and 6 minutes continuing to stand by in Mission Control Center, this is Apollo Control, Houston.

SC It might be interesting to note that we have been using the little separator on our water guide and we are working off the separator (garbled) right hand side of the LEB and it's very good water (garbled). It's got a few bubbles in it.

CAPCOM Real good, Pete, nothing but the best for you.

END OF TAPE

CAPCOM 12, Houston.

SC Go ahead and relay it.

CAPCOM Folks down here have been looking over the LM EMOD and it looks very good to us. See no problem. Would you also take the O2 fans and put them to OFF. We're pretty high on the tank. Pressure's 883 and 893.

SC Okay, they're both OFF. And thanks for that information on the LM.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, CST 19:58, GET 9:36 63/1

PAO This is Apollo Control Houston at 9 hours, 36 minutes now into the flight of Apollo 12. We've had no further conversations with the spacecraft since our last report, however, we thought we would provide you an update of our current altitude and velocity. Presently, we show the Apollo 12 spacecraft at 45 708 nautical miles above the earth; velocity now reads 8623 feet per second. At 9 hours, 37 minutes into the flight and continuing to monitor, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/14/69, GET 10:00:00, CST 20:22, 64/1

PAO This is Apollo control, Houston, at 10 hours ground elapsed time now in the flight of Apollo 12. The Apollo 12 spacecraft now at 47 619 nautical miles above the Earth. Currently travelling at a speed of 8 418 feet per second. Since our last report, we've had some conversation with the crew of Apollo 12 and we'll pass that along to you now.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM 12, if you'll go to P00 and accept, we'll give you a new state vector. Negative on the P00, just accept. Okay, 12, it's coming up. We're looking for a mid-course two tomorrow at 31 hours for about 61 feet per second, and also we have here an update to erasable load in your alternate contingency checklist on page 1-32 when you're ready to copy.

SC Go ahead, Ed. We'll get on the flight plan and transfer it later. Is this TFF?

CAPCOM That's affirmative. And that update is two lines. Column B, line 4, 14616. Line 5, 13744.

SC Okay, Houston. What page was that?
We got column B, line 4 as 14616 and line 5, 13744.

CAPCOM Roger. All numbers are good, and that's on page 1-32.

CAPCOM It's in your alternate contingency checklist.

SC We got it.

CAPCOM 12. The uplink is complete. You can go back to block.

SC Roger. What did you give me?

CAPCOM Gave you a good state vector.

SC You mean I've ruined it, huh? Ed, are you tell me that I ruined it with my P23?

CAPCOM Dick, standby on that, and we'll see what your P23 did do.

CAPCOM Dick, it looks as though your P23 did include your state vector. However, we had a little longer time to work on it. About 6 hours worth of misfin, and we gave you one a tad more accurate.

SC Thank you.

PAO This is Apollo control, Houston. As you heard, Ed Gibson passed up our forecast mid-course correction two. This is the mid-course correction that takes the spacecraft out of a free return and places it into it's - what is known as a hybrid trajectory. This time identified as 31 hours which would be tomorrow, and Delta-V of 60 - a velocity change of 61 feet per second. Chatting with Ed Gibson, during this conversational phase were both Al Bean and Dick Gordon. The P23 referred to program 23 is one of the computer programs which is cislunar navigation

APOLLO 12 MISSION COMMENTARY, 11/14/69, GET 10:00:00, CST 20:22, 64/2

PAO - where command module pilot, Dick Gordon has been taking star sightings and updating his own state vector. So at 10 hours 4 minutes into the flight continuing to monitor, this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 10 hours and 30 minutes into the flight of Apollo 12. We currently show the Apollo 12 spacecraft at 49 972 nautical miles above the earth. Its velocity now reads 8175.7 feet per second. We've had conversation with Apollo 12 and we will pass that conversation on to you now.

SC Houston, 12.

CAPCOM 12, Houston, go ahead.

SC You want that P52 at 10:45?

CAPCOM Stand by on that, Pete.

SC Okay.

CAPCOM Pete, that P52 is really your option.

We don't need it. You can go ahead and do it if you like. You have one coming up around 15 hours and that will suffice.

SC Okay. We'll wait.

CAPCOM Roger.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM 12, we are still looking at a current going over to the LM which is about 1 amp higher than before it was manned. It still fluctuates, but the mean is still about 1 amp higher. So we are faced with the question of whether we have outer configuration on the LM and we would like to suggest that you go on back over to the LM and check the circuit breaker configuration. The possibility here is that you've got a system outlined which is not called off for and doesn't have proper cooling. Slight edges off on that.

SC Okay, we're going to go back over if you want. Now, we left those two panels, as far as I know, in the proper configuration, but we'll go back over. The other thought that I had, I noticed that when I closed the hatch, I tried to get the hatch all the way up to the very corner and watch the lights go out. I know the light switch works on the hatch because I tried that, but that would be the only other thing that I can think of that didn't work.

CAPCOM Okay, so those flood lights did go out when the hatch was closed.

SC Right now I don't know that they went out. I am saying that if you push the switch it went out.

CAPCOM Okay, that indicates at least that you didn't have the switch out of position.

PAO This is Apollo Control, Houston. As you heard that discussion between capsule communicator Ed Gibson in mission control and spacecraft commander Pete Conrad. There is a very distinct possibility the crew will make a

PAO second trip into the lunar module this evening, principally to explore or check the position of circuit breakers aboard the LM. The discussion dealt with a consistent number we been saying, one in which there has been a reading of 1 amp higher since - 1 amp difference since the two crew members had gone over earlier, a reading higher than had been reflected previously. Because of this possibility that Conrad and Bean will return to the lunar module, we propose to leave the release circuit up and live at least for awhile and at 10 hours and 34 minutes into the flight continuing to monitor, this is Apollo Control, Houston.

SC Houston, we are in our way back now.

CAPCOM Roger, Pete.

SC We'll get the world's record for ingress, egress out of this baby in a couple more.

CAPCOM Rog. Give us a mark.

CAPCOM Pete, we assume that you powered down the circuit breaker panel as an activation 3 and 4. Two circuit breakers there that should be out which are shown in. One is utility light which we discussed and the other under ECS, Panel 16, the cabin repress, should also be out. That was closed in a previous step.

SC We'll check it.

PAO This is Apollo Control, Houston. We presently show Apollo 12 50 526 nautical miles above the earth. Velocity now is 8122 feet per second. Standing by, this is Apollo Control, Houston.

END OF TAPE

SC Okay Houston, you got any more about the utility circuit, utility light circuit breaker on panel 11 is out and the cabinet repress circuit breaker on panel 16 is out.

CAPCOM Rog Pete. We copy that. Stand by and we'll see if there is anything else we can do while we're in there.

SC Okay. We're going to go through the whole A to Z here again.

SC Okay Houston. We've got a question for you. We're going back to the last time we put our exterior lighting switch from dock to OFF since we already docked and it may be that when it's in OFF it doesn't turn out the cabin lights in closing the hatch. Did you check that?

CAPCOM Rog. We'll check that. We saw down here that when you opened the hatch, you didn't get any drop in the current and we suspect that the problem was a flood light, but stand by on that.

CAPCOM Pete, would you go ahead and verify the position of the floodlights switch. Verify that it's off?

SC Floodlights are OFF and exterior lighting in OFF. We also punched the little button on the hatch and the floodlights went off.

CAPCOM Roger, we copy.

PAO This is Apollo Control, Houston. You hear Pete Conrad and Al Bean speaking from the Lunar Module. They are currently going through the circuit breaker configuration at this time. Receiving updates from Ed Gibson our Capsule Communicator at Mission Control Center. Ten hours, 45 minutes - -

CAPCOM 12, would you go ahead and open the floodlight circuit breaker, panel 16 and we'll troubleshoot. We'll be watching the current down here. See if we get a change.

SC No, if you pull that circuit breaker on the LM, the certain DSKY you've got 4/10th of an amp correction 4/10ths of a volt.

CAPCOM Roger 12. We confirm that. We show a drop in amps back to what looks to be the same before you went in. We'd like you to go ahead and leave that circuit breaker OPEN and you can leave in that configuration when you leave the LM. When you go back in, of course, we'll just have to punch it in.

SC Okay, we'll get back on the LM, Houston. Must be that switch in the hatch is out of adjustment somehow.

SC Yeah, he can put the switch works by me putting my finger on it and it may not cut it off when it's closed anymore.

CAPCOM Roger Pete, we concur with that.

APOLLO 12 MISSION COMMENTARY, 11/14/69, CST 21:02, GET 10:40 66/2

PAO Okay, you heard that last exchange. The amperage has been brought down and Ed Gibson did pass along the word to leave the floodlight circuit breaker OPEN when they depart the Lunar Module. When they made that switch- -

SC (garble) just a second, and goes in the hatch another centimeter.

PAO When they made that switch, Flight Director Pete Franks said "That did it, we're down where we were". We're at 10 hours, 48 minutes at the present time and we now show an altitude, on Apollo 12, of 51 336 nautical miles; velocity now reads 8044 feet per second. This is Apollo Control Houston.

SC Hello Houston, 12.

CAPCOM 12, go ahead.

SC Roger. I guess that's it, have checked the LM's service test meter and Pete came back in and closed the hatch and locked it completely, and the test meter didn't drop at all.

SC Shall we drop back in and pull the floodlight circuit breaker now we're down to the bottom.

CAPCOM Roger.

END OF TAPE

PAO This is Apollo Control Houston at 10 hours 53 minutes now into the flight of Apollo 12. We're in the process of returning Pete Conrad and Al Bean to the command module at this time. Their return is in progress. The floodlight referred to, by the way, is much like a refrigerator light. It's the kind of device that you can punch it with your finger to turn it off apparently and the hatch did not adequately shut it down. And so the procedure that has been taken has been to leave that circuit breaker open. Our amperage readings are now the same as they were prior to the first manned excursion into the lunar module. We'll standby and continue to monitor at 10 hours 54 minutes. And this is Apollo Control Houston.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM 12, along back you read to us some service module RCS propellant quantities and they showed off scale high. Also the TM from that gage is still reading off scale high. And we suspect a problem with the gage. If you'd like to do some troubleshooting on that and have you look at those four propellant quantity readings again and also look at the service module indicator to put that helium tank temperature and read the four quantities. For your information - for your information, our calculations down here show your RCS total is 86, A is 84, B 88, C 84 and D is 89.

SC Okay, I just checked all A B C and D and they're all still reading off scale high. And then the tank in the service module RCS indicator (garbled) is reading (garbled) on A. It's reading 85 on B, 85 on C and 65 on D.

CAPCOM Roger, Pete. Copy 70, 85, 85 and 65.

SC Yes. And something I forgot to pass on, I guess, I think I did. When we separated from the S-IVB prior to turning around, I believe it was -

END OF TAPE

S/C Yeah, it's something I forgot to pass on, I guess. I think I did. When we stepped from the S-IVB, prior to turning around, I believe it was helium one, B barber pole, and system A secondary propellant, barber pole and that was it. We turned them both on and away we went.

CAPCOM Roger, Pete. We copy that.

S/C We also, Houston, think that our helium gauge is out. It's been reading zero; we changed our cannisters at the proper time and we had - when was it - during power - flight, Ed - yeah during launch we had a flashing PC CO2 light long with a few others. This thing jumped all over the place and all of a sudden it went to zero then it moved off the peg. So I kind of got the suspicion that the PC CO2 gauge was out.

CAPCOM Roger. Pete. We confirm or suspect that down here.

PAO This is Apollo Control, Houston. That's Pete Conrad now back in the command module doing this trouble shooting with Ed Gibson on the ground. We are now at 11 hours, 13 minutes into the flight of Apollo 12. Presently 53,187 nautical miles above the earth and now traveling at 7,870 feet per second. This is Apollo Control, Houston, continuing to monitor.

CAPCOM 12. Houston.

S/C Hello there Houston. Go ahead.

CAPCOM Say since you got those two indications on the barber pole indications, we would like to have you verify that you did complete the step of throwing the secondary propellant service module RCS to CLOSE and then back to R.

S/C That's affirmative.

CAPCOM Roger.

PAO This is Apollo Control, Houston, at 11 hours, 25 minutes ground elapsed time into the flight of Apollo 12. Now we have had no conversation with the crew of Apollo 12 for some minutes now; however, we thought we would pass along to you the current altitude and velocity reading. Our digital displays now show the Apollo 12 spacecraft at 54,092 nautical miles above the earth, velocity reading 7,786.9 feet per second. We'll continue to monitor the air to ground loop and this is Apollo Control, Houston.

CAPCOM Apollo 12, Houston.

S/C Go.

CAPCOM Flight plan at this time calls for terminating the battery B charge because of the exercise this morning and the fact that you drained down the batteries, we would like you to continue charging battery B and we suspect it will probably go on to about 13 hours. We will give you a call when we would like you to go battery A. Also, perform your -

END OF TAPE

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM Flight plan at this time calls for terminating the battery B charge. Because of the exercise this morning, and the fact that it drained down the batteries. We'd like you to continue charging battery B and we suspect that it'll probably go on about 13 hours. We'll give you a call when we'd like for you to go over to battery A. Also you can perform your O2 fuel cell purge as planned, and if you hold out - take that waste water dump down to about 15 per cent rather than the nominal 25, you won't have to have another dump until about mid-course 2.

SC Understand.

PAO This is Apollo control, Houston at 11 hours 35 minutes now in the flight of Apollo 12. Current altitude 54 812 nautical miles for the Apollo spacecraft above the Earth. It is now travelling at 7724 feet per second. Because our conversational pace with the crew is spacing itself out once again, we will be taking the air-ground loop off the line and will play a tape of any conversations as they occur. If - and we will follow the same procedure as we did previously if the situation warrants to bring the line backup live, we will do so. So at 11 hours and 36 minutes and continuing to monitor, this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 11 hours, 58 minutes now into the flight of Apollo 12. Since our last report we have had only a brief conversation exchange with the crew and we'll pass that along now.

SC Okay, we're going to turn off the dump now.

SC Say,ouston, how far out are we?

CAPCOM Stand by, Pete, we'll give you a good figure.

SC Thank you.

CAPCOM You are about 56 000 miles out now and you are smoking along at 7600 feet per second.

SC Okay. Thank you.

SC Hey, Al, are you still at the window.

SC That's affirmative.

SC HOuston, Apollo 12

CAPCOM 12, Houston; go ahead.

SC The earth doesn't seem to be getting smaller too fast right now, but it is sort of funny. It just seems to hang out there. You can't see it move or anything. It just sort of hangs out there in this black space and the moon doesn't seem to be any bigger than it was when we let but it looks more like a sphere also. It sort of looks like a ball that is being hung out there somehow. It's really crazy.

CAPCOM Al, which way does it look like it is hanging from?

SC North Pole, naturally. Otherwise the string would get all tangled up.

SC Just scientists are supposed to know that.

CAPCOM You need some experimental proof.

SC That subsolar point is over the water now and it glints on the surface of the earth like a light on a billard ball or something. There is a little spot there that gives you a little peculiar reflection and there is a bright halo, just a bright area, around it. It looks like we can see the coast of China and Japan now. It's kind of hard to tell. You can see red pretty well, but if there's reens or grays, it is very difficult to (garbled) distinguish ues.

CAPCOM Roger, Al. That glint, is that about a quarter of the way off - half-way between the terminator and the ege?

SC That's about right.

PAO This is Apollo Control, Houston. Presently the Apollo 12 spacecraft is 56 766 nautical miles above the earth now traveling at a speed of 7555 feet per second.

PAO You heard during that taped playback, Commander Pete Conrad ask how far out they were. They have progressed some 795 miles since he asked that question. That was Al Bean vividly describing the earth as they viewed it from in excess of 56 000 nautical miles. At 12 hours and 3 minutes into the flight of Apollo 12, this is Apollo Control, HOuston.

PAO This is Apollo Control Houston at 12 hours 21 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft at the present time 58 160 nautical miles away from Earth. It is now traveling at 7439 feet per second. Since our last report, we've had several conversation exchanges with the Apollo 12 crew. Interestingly enough, you will note that in these conversations, the conversations are interspersed with bits of music. And in most instances, the country and western style prevails. Commander Pete Conrad is an acknowledged country and western music fan. At this point, we'll roll the tape.

SC Al's getting homesick up here with you trying to keep Pete happy.

SC Pete, is that you singing?

SC No, unfortunately.

CAPCOM Pete, let's hear a little of that good music.

CAPCOM Okay, that's enough.

SC I asked for a little of the good music.

SC Roger, roger. Just a minute, I'll see if I can find it.

CAPCOM Pete, all the folks down here feel that isn't half bad.

CAPCOM All bad.

SC Well, I'll tell you what it's done. It's precipitated a big search for the rest of the tapes. Al and Dick are scurrying all over the spacecraft.

CAPCOM Can we help?

SC Houston, 12.

CAPCOM 12, Houston, go ahead.

SC Okay, what about the waste storage vent?

CAPCOM 12, you can go ahead and close it now.

SC Okay and we'll hold off til we finish charging battery B, before we dump the battery compartment.

CAPCOM Roger, Dick that sounds good.

SC Ed, I guess we might as well start logging this leak rate now for the LM. It's DELTA P is plus two tenths right and at this time. I don't think we'll be into it for a day or so now so we can start logging and 0 on our gage is point 1 plus point 1.

CAPCOM Roger. Copy DELTA P point 2 and 0 is point 1.

SC That's affirmative.

SC Houston, this is 12. We went ahead and vented that battery right now and it's on its way down to zero and went to three volts when we started.

CAPCOM Roger, 12.

SC Okay, Houston at 12 24 it says here in our flight plan that we'll be full flams for a 500 millimeter and we have it out and I presume that that time is still pretty good.

CAPCOM Standby on that, Pete.

CAPCOM Pete, was that recent write-in to the flight plan?

APOLLO 12 MISSION COMMENTARY 11/14/69 CST 22:43 GET 12:21 71/2

SC No, it's on our photo card. We just thought that up before we left.

CAPCOM Roger.

CAPCOM Pete, those variers of the S-stops you just questioned look good. That's F11 for the earth, F8 for the moon.

SC Okay. Thank you.

PAO This is Apollo Control of Houston. The country and western style of music which predominated at least a goodly segment of that played down by the crew in courtesy of Commander Pete Conrad, Commander Conrad being an acknowledged country and western music fan. The music came to us from their tape cassettes aboard the spacecraft. At 12 hours, 27 minutes our digital displays now show Apollo 12 at 58 586 nautical miles above the earth. It's velocity continuing at a steady decrease now reading 7404 feet per second. This is Apollo Control, Houston.

END OF TAPE .

PAO This is Apollo Control Houston at 12 hours 51 minutes now into the flight. Our displays currently show the Apollo 12 spacecraft at 60,257 nautical miles in altitude, current velocity reading of 7269 feet per second. We will play that tape accumulated since our last report at this time.

S/C Is that any better?

CAPCOM Well, we suggest Dick, that maybe you continue securing around there.

S/C Oh you're really hard today, aren't you?

S/C Okay.

S/C That earth view is really going to be something weird coming back, Houston, when you only got about a - just a little bitty sliver of the earth, because like I said earlier, you just can't see anything, but the black. Then when we had that eclipse it was about, I guess, the earth completely disappeared.

CAPCOM Roger, Al, copy. You see Australia coming up over there by the H?

S/C Ahh you sorta do. It is difficult to tell, unless the ground has a pretty good contrast to the water, and I can see some red over there, I'm not really sure whether that's Australia or exactly what it is, it makes you wish you had studied your geometry harder in High School or something.

PAO This is Apollo Control Houston, more music from the Apollo 12 spacecraft. We heard from both Dick Gordon and Al Bean during this transmission. That was Al talking about the earth once again in referring to an earlier conversation. We've picked up the crew again and we will switch to that transmission, live.

S/C Okay, Houston, we've got - Roger, we've got Australia in sight now at the - oh it's about 8 o'clock position, with respect to the terminator.

S/C Pete is using the banocqolor right now, what do you say, Pete?

CAPCOM Al, are you able to pick out any small islands?

S/C There's a lot of clouds out there, Houston. I can see a lot of fairly small clouds, but there is so darn much cloud coverage, around in the Pacific, except right off of the northeast coast of Australia, that I really haven't found any islands, yet, but I am scanning for them now.

CAPCOM Roger.

PAO This Apollo Control Houston, 12 hours 58 minutes now into the flight. We'll take the line down at this time and pick back up as the mission progresses. We currently show an altitude reading of 60,684 nautical miles above the earth. The velocity now shows 72,036 feet per second. This is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 13 hours 22 minutes now into the flight of Apollo 12. Apollo 12 now 62 373 nautical miles above the Earth. Our display currently shows the velocity reading 7107 feet per second as the spacecraft steadily slows down. For the past several minutes, we've had, in the Mission Control center, had a replay of the translunar injection burn, those viewing the television monitors may have noted the world map was briefly taken down. This was done at the request of the guidance officer who was analyzing the data which had been received only a short while ago from Hawaii. We have several minutes of tape to play back to you - conversations between our capsule communicator, Ed Gibson, and the crew of Apollo 12. We'll play those tapes at this time.

CAPCOM Houston. Go ahead.

SC Roger. Have you been plotting this PBC on the ball? How's it looking?

CAPCOM Roger, Dick. We've been watching it. Stand by.

CAPCOM Dick, we've been looking at your trace here, and it looks as though you're up to about 20 degrees now. You're just sort of pig tailing out. What gave you a large excursion was the waste water dump. It looks as though you'll be heading back in. You won't really significantly improve, that is, you won't really get the alignment rate right down close to zero at the rate you're going, but you'll stay within 30 degrees so just hold what you've got.

SC Okay, Ed. Thank you.

CAPCOM Apollo 12, Houston. We have some P37 pads for lift-off, 25, 35, 45, and 60 when you're ready to copy.

SC Okay. Mr. Bean is busying himself finding the pad at this time and he'll be ready to copy in just a minute.

CAPCOM Roger.

SC Go.

CAPCOM P37 block data. 025 00, 4227, minus 169, 07412, 03500, 6327, minus 166, 07339, 04500, 4917, minus 168, 09758, 06000, 4496, minus 168, 12201. Good, Al. Readback.

SC Okay. The last one I got before we lost S-band here with you was the 122, and I didn't copy the last part GT4 and K.

CAPCOM Okay. GET at 400K was 12201.

SC Okay. Readback. 02500, 4227 (garbled)

CAPCOM Al, hold up. Your transmissions are all broken.

SC I'll see if I can get a little closer to the mike. Do you want me to start over again?

CAPCOM Stand by, Al. We still have a lot of static on the line.

SC Okay.

CAPCOM Okay, Al. Go ahead with your readback. After 02500 we pretty much lost all of it.

SC Okay. I'll start. 02500, 227, minus 169, 07412, 03500, 6327, minus 166, 07339, 04500, 4917, minus 168, 09758, 06000, 4496, minus 168, 12201.

CAPCOM Readback correct, Al.

SC Hello, Houston. 12.

CAPCOM 12, Houston. Go ahead.

SC Roger. (garbled) get another calibration point for our service test meter. Looks like the battery compartment is band S when it reads 4 tenths of a volt.

C Its been on for about 30 minutes and going lower. Can the computers take a look at that. that.

CAPCOM Roger. Copy. Voltage perturbed is .4.

SC Roger. You can come as close to that at this time, starting at battery B charge - battery ALPHA charge.

CAPCOM Dick, we'd like to go ahead and close the battery manifold but continue charging battery B.

SC Okay.

CAPCOM Dick, we estimate another 30 to 45 minutes for charging battery BRAVO.

SC Okay.

PAO This is Apollo control, Houston. Of the long listing of numbers exchanged between CAPCOM, Ed Gibson, and Alan Bean aboard the spacecraft, were the representative P37 pad. P37 is a return to Earth computer program. The numbers identified at 25, 35, 45, and 60 are plus times and hours from lift-off. At 13 hours 31 minutes into the flight, we now show Apollo 12 with an altitude of 62 957 nautical miles; its velocity now reads 7064 feet per second. This is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston at 14 hours, 2 minutes now into the flight of Apollo 12. Our displays currently show Apollo 12 at 65 043 nautical miles above the Earth. Velocity now reads 6911 feet per second. Here in the Mission Control Center we're in the process of having a pass over between shifts. Clif Charlesworth, the Flight Director, of the Green Shift is now in the Control Center and going over the status of Pete Frank's shift with Flight Director Pete Frank. They will be coming on shortly. Meanwhile we have approximately 1 minute of tape which we will play for you now.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Dick, you can go ahead and stop charging battery Bravo and start on battery Alpha. If you go ahead and charge that until you hit the sleep period, you'll be able to get 60 percent of the charge back in.

SC Okay. We're going to go off batt B and start charging batt A.

CAPCOM Roger.

SC Okay. We're charging batt A at this time.

CAPCOM Roger, 12.

PAO This is Apollo Control Houston at 14 hours, 4 minutes now into the flight of Apollo 12.

END OF TAPE

PAO This is Apollo Control, 15 hours, 8 minutes ground elapsed time. Apollo 12 presently 69010 nautical miles out from Earth traveling at a velocity of 6639 feet per second. The crew of Apollo 12 at this time are running what they call program 23 exercises, says Lunar Navigation, in which the included angle between the star and either the near Earth horizon or the far Earth's horizon is measured. The onboard computer has stored data on the stars and part of the 35 navigational stars used in the Apollo program. The techniques used are actually extensions, more sophisticated versions of the celestial navigation techniques which for centuries Mariners have been using to locate their position on Earth. In this case there is a third dimension added, space or depth. We have approximately 5 minutes accumulated tape from the crew in the recent exchanges between the spacecraft communicator Don Lynn here in mission control center. We'll run this tape by now.

CAPCOM Apollo 12, Houston.

SC All right, Houston.

CAPCOM Roger. We're suggesting here that when you terminate your PTC, you go directly to your P23 attitude as listed in the flight plan to do your P52. There should be good stars there and it will save one attitude maneuver later.

SC Okay.

CAPCOM At the P23 optics cal, the roll is 204 pitch 262 and yaw 0.

SC Okay.

SC Welcome aboard, Don.

CAPCOM You certainly had an exciting one this morning.

SC Yes. It keeps recurring in our conversation throughout the day today. (garble)

CAPCOM That's affirmative. We saw lightning coming right down your flum, right to the ground.

SC Are you kidding me, or not?

CAPCOM That's on the reports we've been getting back.

SC I believe it.

CAPCOM I keep telling you, you don't fly through thunder storms.

SC I keep wondering why they write that in all the handbooks. They can write that in the Saturn V handbook now.

SC Houston, Apollo 12

CAPCOM Houston, go.

SC You know these marks are going to be good. Dick (garble)

CAPCOM Roger

SC I was looking at the Earth, people, and it was as though you could see the entire top of Australia. It really is pretty. There are hardly any clouds at all over it, and looks to me like it to be about 1-1/2 to 2 times the size of a

SC golf ball.

APCOM Should be pretty impressive view from that altitude.

CAPCOM Apollo 12, would you select onmi alpha, please?

SC Roger, it didn't seem to change anything.

CAPCOM Houston, say again.

SC Roger we were watching the signals strength and it didn't seem to affect it much.

CAPCOM We're anticipating.

SC Okay.

SC Say, Houston, 12.

CAPCOM Go.

SC Our pick-a-pair has put the star in the LM. Have you got a couple of stars to this attitude that would not blockage by the LM?

CAPCOM Stand by.

CAPCOM Apollo 12. It looks like you beat the computer down here. Procyon and Rigel are the ones that we're recommending that's 16 Procyon and 12 Rigel.

SC Okay. And here's data 5 for you here. The torquing angles coming down.

CAPCOM Roger.

SC Okay. Houston, are you docking in those torquing angles?

CAPCOM That's affirmative.

SC Have you got them, Houston?

CAPCOM That's affirmative.

SC Okay.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM It looks like you have got a pretty good platform up there, since the last P52 you've had - you show about 1.4 and may exist in Z and the other two attitudes are better than that so we're quite pleased with that down here. Also, we would like you to confirm the position of your SCE power push.

SC SCE power is in normal.

CAPCOM In normal, roger.

PAO This is Apollo Control. That concludes the playback of accumulated voice tape. We're now at 15 hours, 15 minutes ground elapsed time. Still a little over 2 hours until the scheduled rest period begins for the crew of Apollo 12, however, it's likely they will sack out a bit earlier than that. They still have an evening meal before they go into the 10 hour rest period and resume the passive thermal control mode, which also is known as the bar-be-que mode, in which they revolve at about 3 revolutions an hour to stabilize the thermal response of the spacecraft to the alternate heating of the sun. At 15 hours, 16 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 16 hours, 8 minutes ground elapsed time. Apollo 12 now 72 989 nautical miles out from earth. Velocity 6383 feet per second. We have some tape accumulated and at the present time spacecraft communicator Don Lind is discussing an earlier start of the sleep period after they complete the presleep checklist and their last meal of the day. We'll roll the tape and then join any live conversation if it's still taking place at that time when the tape is completed. Let's hear the tape.

SC Hello, Houston, Apollo 12.

CAPCOM Go ahead.

SC Houston, 12.

CAPCOM Roger, Houston. What state vectors do you have in the LM slot?

CAPCOM It's the CSM power to the P23.

SC Thank you.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. It looks like we're ready for PTC now and when you start the maneuver we would suggest the Omni Bravo.

SC Sure, Omni Bravo.

SC Hey, Houston, how do those P23's look to the guys in the back?

CAPCOM It looks great.

SC They're real happy, huh?

CAPCOM They sure are.

SC Okay. If they're happy, I'm happy.

CAPCOM 12, we've got an uplink to the gyro drift whenever you can give us the computer.

SC Okay, it's all yours.

CAPCOM Thank you.

CAPCOM Apollo 12, the computer's yours again. Thank you.

CAPCOM Apollo 12, Houston. We're finished with the computer. It's yours again.

SC Okay. Thank you.

CAPCOM Thank you.

CAPCOM This is Houston, 12. Did you call?

SC That's negative, Houston. Some other spacecraft must have called in.

CAPCOM Roger. I was hearing you occasionally weak and we're not sure whether it's you or the other.

SC Roger, Roger.

CAPCOM Apollo 12, Houston. Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. We want to make a couple of suggestions for you before you settle down for the night and we wanted to leave that up to your option, when you want to go to sleep after you eat and a couple of items we wanted to remind you of that you'll

CAPCOM have to include before you settle down for the night. First one is that the H2 tank both 1 and 2 should be in AUTO. You would terminate the battery charge and you'd change the lithium hydroxide canister and then we wanted to leave it up to you when you wanted to terminate your activity today.

SC Okay. We understand about the battery charge and we intend to change the canister on time and more than likely we'll try to go to bed at the proper time although we may go a little bit earlier. We're awfully tired.

CAPCOM Roger. That's fine with us and we can understand that you might want a little extra sleep.

CAPCOM 12, in case I was not clear on that, we suggest that you go with the heaters to AUTO after you finish the presleep checklist.

SC Okay, H2 heaters to AUTO after presleep checklist.
Roger, Roger.

PAO This is Apollo Control. That completes the most recent exchange between the spacecraft communicator and the crew of Apollo 12 who at this time are settling in for the night and likely will be in their sleep periods somewhat early. At 16 hours, 14 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 17 hours 08 minutes, ground elapsed time. Apollo 12 is presently 6579 nautical miles up from earth. The velocity now 6,166 feet per second, continuing to decelerate as we approach the midpoint in the gravispheres between the moon and the earth. We have an accumulation of tape, some few seconds in which the crew of Apollo 12 has been discussing some of the last housekeeping problems, prior to entering the sleep period. We will replay these conversations at this time.

S/C You guys calling, Houston?

CAPCOM Not us, you must be talking to somebody strange now.

S/C Okay

CAPCOM Apollo 12, Houston

CAPCOM Apollo 12, Houston

S/C Go ahead Houston.

CAPCOM Listen, those transmissions you thought you heard a couple of minutes ago were us throwing some PGNCS checks, we didn't think they were getting out, but apparently, they did, so apparently, nobody is up there flying with you.

S/C Okay, very good.

S/C Houston, Apollo 12.

CAPCOM Go

S/C How about a E memory dump?

CAPCOM We are all ready.

S/C Coming at you.

CAPCOM Apollo 12, Houston.

S/C Go ahead Houston.

CAPCOM Could you give us that dump again, we switched bit rate on you in the middle and fouled ourselves up.

S/C Coming at you, Houston

CAPCOM Thank you.

S/C As you can see, we don't have any service module RCS propellents gauge that is working, could you give us our present ABC to B quads R, please?

S/C Houston, Apollo 12.

CAPCOM Go.

S/C Roger, did you get my last request?

CAPCOM Yea, we're trying to work those out, the RCS section, consumables.

S/C Oh, Okay. Thank you.

CAPCOM We're working on it.

CAPCOM Apollo 12, Houston.

S/C Go ahead.

CAPCOM Okay, I've got your RCS propellant for you. The total is 83.2 percent, alpha is 80.5, bravo is 85.3, Charlie) is 81.4, delta is 85.4, that is as it stands about 2 minutes ago and also we got your E Dump successfully.

S/C That perfect.

CAPCOM Roger.

APOLLO 12, MISSION COMMENTARY, 11/15/69 CST 0330, GET 17:08:00 77/2

PAO This is Apollo 12 Control. That brings us up to speed with the accumulated tape conversations. Apollo 12 now some 76,872 nautical miles and while we watch the display it jumped to 76,884 nautical miles out from earth. Velocity continuing to decelerate, now 6,148.5 feet per second. Total vehicle weight in earth pounds, 96,440. Extending a line outward from the earth to the position of Apollo 12, it is presently directly over the equator, just north of the Island of New Guinea, more specifically north of West Irian at 76,000 miles out. AT 17 hours 14 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, CST 04:00, GET 17:38 78/1

PAO This is Apollo Control 17 hours, 38 minutes ground elapse time. The crew of Apollo 12 completed their presleep check list at about 17 hours, 19 minutes ground elapse time. And we're finally tucked in for the night via spacecraft commnicator Don Lint. We have a few minutes of air to ground conversation on tape. During this final conversation before the 10 hour rest period. We'll listen to that now.

SC Houston, 12.

CAPCOM Go.

SC Okay, the presleep checklist is complete. We have no medical prostatus report and we're going to the lunar COM ode except S-band normal so forth and so on.

CAPCOM Roger. Have pleasant dreams. See you in the morning.

SC Okay. The battery charge is going OFF at this time.

CAPCOM Roger. Apollo 12, Houston. Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Sorry to bother you again, Pete. We need pile batt readouts from you if we could. We'd also like to get a LM, Command Module Delta-P reading and a confirmation that the heaters are on AUTO. The cryo heaters.

SC Okay. The heaters are on AUTO, batt C's 37.1, pry batt A 37.2, pry batt B 37.2 and the left CSM Delta-P is plus .4.

CAPCOM Roger. We've got it all. Thanks very much and have a pleasant nights sleep.

SC Okay.

PAO This is Apollo Control. That completes the wrap up of the last few moments of conversation prior to the crew sacking out fr the night. Apollo 12 now 78 503 nautical miles out from Earth traveling at a velocity of 6055 feet per second. And at 17 hours, 41 minutes ground elapse time, this is pollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, 05:03 CST, 18:41:00 GET 79/1

PAO This is Apollo Control. 18 hours 41 minutes ground elapsed time. Apollo 12 crew apparently asleep at this time. Now some 81 705 nautical miles out from Earth. Velocity continuing to decrease. 5877 feet per second. One clock here in the Control Center has been set to show the time remaining in the 10-hour sleep period. The clock now shows 9 hours 17 minutes remaining. And at 18 hours 42 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/15/69 CST 06:38 GET 20:16 80/1

PAO This is Apollo Control at 20 hours, 16 minutes ground elapsed time. The crew of Apollo 12 still apparently asleep at this time. Some 7 hours, 43 minutes remaining in the sleep period. The spacecraft now, 87 149 nautical miles out from Earth. Velocity 5 592 feet per second. The space flight meteorology group and the weather bureau said this morning that the weather conditions in the planned landing areas are expected to be satisfactory for the next 4 days. Ocean areas of concern should have partly cloudy to cloudy skies, winds 10 to 15 knots, seas 3 to 4 feet, temperatures in the Atlantic area in the upper 70's. Temperatures in the Pacific area in the mid 80's. Isolated showers in the Atlantic area and widely scattered showers in the Pacific area. And at 20 hours, 17 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, CDT 8:40, GET 22:18:00 81/1

PAO This is Apollo Control at 22 hours, 18 minutes into the mission. The Apollo 12 crew still asleep. They show 5 hours, 41 minutes remaining in this rest period. All systems continue to function satisfactorily. Apollo 12 is 127 851 nautical miles from earth traveling at a velocity of 4039 feet per second. The flight controller team led by Flight Director Jerry Griffin has taken over here in the control center. This is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, CST 0849, GET 22:27 82/1

PAO This is Apollo Control at 22 hours 27 minutes. We have a correction on the last figures passed, the distance and velocity. Those figures were moon reference figures, not earth reference. The present earth reference distance 93 351 nautical miles, velocity 5292 feet per second. The previous figures were referenced from the moon.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/15/69 09:40AMCST GET 23:18:00 83/1

PAO This is Apollo Control at 23 hours 18 minutes. Crew still has 4 hours 41 minutes remaining in it's rest period. But the flight controllers here are at this time reviewing the playback of yesterday's television transcript, it's mission. Apollo 12 is 96 456 nautical miles from earth. Traveling at a velocity of about 5 149 feet per second. Apollo 12 will be equal distance between the earth and the moon at an elapsed time of 29 hours 16 minutes 53 seconds. The distance to both bodies from the spacecraft will be 112 899 nautical miles at that time and the CAPCOM on this shift is Astronaut Paul White's who has relieved Astronaut Don Lind. This is Mission Control, Houston at 23 hours 19 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, GET 241800, CST 1040 84/1

PAO This is Apollo Control at 24 hours 18 minutes into the mission. 3 hours and 41 minutes remain in the sleep period for the Apollo 12 crew. Apollo 12 is 99 360 nautical miles from earth, velocity is 5020 feet per second. Total weight of Apollo 12 now at 96 869 pounds. The Flights Dynamics Officer using data gathered from the last look at the S IVB has predicted its trajectory. This will be the last update on this predicted trajectory for the third stage of the booster. Its closest approach to the Moon will be 3091 nautical miles, its velocity at that time will be 4934 feet per second, and the elapsed time at which it reaches this closest approach is 85 hours 48 minutes 4 seconds. The S IVB is then expected to go on into a solar orbit. This is Mission Control, Houston at 24 hours 19 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, CST 1140 GET 25:18 85/1

PAO This is Apollo Control at 25 hours 18 minutes. Apollo 12 is 102 203 nautical miles from earth, traveling at a velocity of 4898 feet per second. The Apollo 12 crew still has 2 hours 41 minutes remaining in their sleep period. The TB 5 clock that shows on the monitors in the News Center is counting from zero Greenwich Mean Time on launch day. Some of the flight controllers, primarily the flight dynamics officers, use this time reference in some of their calculations. It's counting from zero Greenwich Mean Time on launch day. We're projecting now a time for arrival at the lunar sphere of influence of 68 hours 30 minutes 22 seconds. This is Mission Control Houston at 25 hours 19 minutes elapsed time.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, GET 261800, CST 1240

86/1

PAO This is Apollo Control at 26 hours, 18 minutes. Apollo 12 is 104 983 nautical miles from earth. Velocity 4 782 feet per second. The Apollo 12 crew still has 1 hour, 41 minutes remaining in its sleep period. All systems on the Apollo 12 spacecraft continue to perform in a normal manner. This is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11-15-69, CDT 13:40, GET 27:18:00 87/1

PAO This is Apollo Control at 27 hours, 18 minutes. Apollo 12 is 107 698 nautical miles from earth traveling at a velocity of 4 672 feet per second, and we will wake up the crew 41 minutes from now. All systems continuing to function satisfactorily. No problems. The crew wake up in 41 minutes. This is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/15/69 14:16 GET 27:54:00 88/1

PAO This is Apollo Control at 27 hours 54 minutes. Pete Conrad has beaten us to the punch by about 5 or 6 minutes. Just as Flight Director, Jerry - Pete is putting in a call just as Jerry Griffin is asking the CAPCOM Paul Weitz to put in a call to him. We'll listen.

CAPCOM Good morning, Pete.

CAPCOM Hello 12, Houston here.

SC Hello, Houston. Hello, Houston. Apollo 12, over.

CAPCOM Good morning, Pete.

SC Morning.

CAPCOM You have everybody up and about there?

SC Everybody's up. They give you a current status report.

CAPCOM But I thought we just had it but go ahead.

SC Okay. Everybody, 8 eight hours of sleep and the PRD's for the CDR is 11 005. For the CMP 11 005, for the LMP 04 006.

CAPCOM Roger, copy.

CAPCOM Apollo 12, Houston. If you want to go ahead and stir your CRYO's we can get good H2 and O2 readout for your consummables update.

SC Okay, that's in work.

CAPCOM Reduce RCS usage, over.

SC Roger.

CAPCOM 12, Houston. Ready with your morning newscast if you are.

SC Okay, go.

CAPCOM Okay, whoever answered me that time was way down in the mud and hardly readable. World attention is on the flight of Apollo 12. The Soviet Union held the crew as courageous and Tass the official Soviet News Agency reported the start of the mission and a brief factual report in both of its Russian and foreign language reports. Czechoslovak television carried a live coverage of the lift off. In West Germany all radio and television networks carried the launch live as did the Japanese broadcasting company. The launch is being described by such adjectives as spooky and cliff hanging. Even President Nixon, a one time Navy man himself, admitted he had some anxious moments but added "I'm really proud of those three men up there". Weather is a news item in Houston where temperatures are expected to dip into the 20's tonight. Automobile owners are being advised to put anti-freeze in their car radiators. Today's a voting day in Houston as Houston picks a Mayor, eight Councilmen, four school board members and decides upon a number of special issues. Now in

CAPCOM sports, Houston Oiler Woody Campbell ended rumors and speculation yesterday by strolling into the Oiler training room and putting on his uniform. He says he's in good shape after 10 months as an MP with the First Infantry Division in Vietnam and hopes to be in action very soon. Working up some ball scores for you; the only one available for you now is a half time score , it's Ohio State 28 and Perdue 7.

SC Houston, 12. Right at the end of the reports on Apollo 12 we changed the antennas did you want to relay some stuff up between that and the election in Houston so would you repeat it, please?

CAPCOM Okay. Yeah, I got several paragraphs in there. Let me start over again and I'll read it on down to where the election in Houston. World Attention is on the flight of Apollo 12. The Soviet Union held the crew as courageous and Tass the official Soviet News Agency reported the start of the mission in a brief actual report in both of its Russian and Foreign language reports. Czechoslovak television carried live coverage of the liftoff complete with an explanation of technical details. In West Germany all radio and television networks carried the launch live as did the Japanese Broadcasting Company. The launch is being described with such adjectives as spooky and cliff hanging. Even President Nixon, a one time Navy man himself, admitted he had some anxious moments but added I'm really proud of those three men up there. And weather is a big news item in Houston where temperatures are expected to dip into the 20's tonight, and there was a fairly heavy frost in the neighborhood last night and then we pick up with the voting which I guess you got.

SC Roger, Roger. Thank you.

CAPCOM And I got a flight plan update when you have a chance.

SC Go ahead.

CAPCOM Okay, Dick. It's 30 30 we called for a waste water dump which is back to our normal procedure of dumping down to 25 percent on that one and at 31 30 want to start a charge on Battery Alpha. Over.

SC All right. Roger, we copy.

SC Waste water dump 30 30, 25 percent. Battery A charge 31 30.

CAPCOM Rog.

CAPCOM 12, Houston. Your PCO2 sensor is powered through a circuit breaker on Panel 5. If you have an -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, GET 280400, CST 1426 89/1

CAPCOM - the preseal 2 sensor is powered through a circuit breaker on panel 5; if you haven't already checked it, would you please transducer pressure group 2; main ALPHA circuit breaker?

SC Okay; wait one. They are all in Houston.

CAPCOM Rog - thank you.

SC Houston; Apollo 12; how far out are we now?

CAPCOM Stand by, and I'll find out for you Al.
12; Houston. Not quite half way at a 110 000 miles.

SC Roger.

CAPCOM 12, Houston. OMNI DELTA please.

CAPCOM 12, Houston; we'll continue to manage your antennas here until you tell us you are ready to take control of them; and I have a consumable update for you.

SC Okay, Houston; we are eating breakfast so we will let you manage it for awhile longer and I'm ready to copy the update.

CAPCOM Okay, the update was at 26:50. Your total RCS is 83.2, reading ALPHA through DELTA, we have 80.5, 86.0, 80.8, 85.4. Your H2 is 87.8, and 85.6, 02 is 87.0, and 87.1; over.

SC Roger; 12 copied.

END OF TAPE

SC Houston, 12.
CAPCOM Go ahead 12.
SC You got any (garble) of what happened up here yesterday? We've been sitting up here chuckling again this morning about it.
CAPCOM Stand by and I'll get a recap on it, Pete.
CAPCOM 12, Houston. Nothing new to report. They're still considering it from 2 3 aspects but nothing confirmed yet.
SC Okay.
CAPCOM 12, Houston. We've got a half dozen or so scores of ball games in progress, if you're interested.
SC Okay. Go ahead.
CAPCOM Okay, final scores. Syracuse beat Navy 15 to 0; in the third quarter, Yale is leading Princeton 14 to 7; in the first quarter, Texas 21, TCU nothing. In the third quarter, Houston's ahead of North Carolina State 34 to 7; in the third quarter Michigan State is leading Minnesota 7 to nothing and that big game in the Big 10, in the third quarter, is now Ohio State 40 and Purdue 7.
SC Okay. Thank you.
SC (Garble) to Paul, this is Dick. And I understand that the University of Houston's homecoming is this week end, wish them well for me please.
CAPCOM Okay. Sure will. We'll pass that on.
SC Sounds like I should have wished Princeton well a little earlier, maybe it's not too late.
CAPCOM Aw - it's only the first quarter. Maybe it will still work.
SC Okay.
SC And I guess Texas doesn't need any help.
CAPCOM Apparently not.
PAO Pete Conrad is a graduate of Princeton. Dick Gordon a graduate of the University of Washington and Al Bean is University of Texas graduate.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69 CST 1503 GET 28:41 91/1

PAO Pete Conrad is a graduate of Princeton, Dick Gordon a graduate of -

PAO This is Apollo Control at 28 hours 42 minutes. Apollo 12 is 111 436 nautical miles from earth, velocity 4525 feet per second.

PAO This is Apollo Control at 28 hours 50 minutes. This is a quiet time as the crew has breakfast. We'll take down this release line now and come back up when there's further conversation.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69 CST 1524, GET 29:02 92/1

PAO This is Apollo Control at 29 hours 2 minutes. We are in contact with the crew passing up some pads for the midcourse correction. Here's that conversation.

CAPCOM 12, Houston. We're not trying to press you but we've got your uplinks and your pads ready whenever you're ready.

SC Okay. We'll give you the computer right now and I'll be ready to copy the pad in just a second.

CAPCOM Okay. And also for information, the burn attitude for MCC-2 will also be a good attitude for P52 and for all your star checks if you want to come out of PTC and just go right to that attitude.

SC Okay. That sounds good. We're ready to copy. The computer is yours, it's in P00 and ACCEPT and Al's ready to copy.

CAPCOM Rog. It's MCC 2. SPS G&N 63284 plus 096 minus 025 030 52 4368 minus 00601 minus 00126 plus 00056 034 095 333. The NOUN 44 blocks are not applicable. 00617 009 00572. Sextant star 22 1505 309. Your boresight star is Vega 036 UP 250 zero deflection, up and down that is, correction left and right. The rest of the pad is NA. Your GDC align line stars are Sirius 15, Rigel 12. The angles are 256 152 069, no ullage; LM weight 33585. Over.

SC Okay Houston. That's 63284 plus 096 minus 025 030 524368 minus 00601 minus 001 plus 6 plus 00056 034 095 333. NA NA 00617 009 00572 221505309 Vega 036 UP 250 00 set stars are Sirius 15, Rigel 12, 256 152 069, no ullage, LM weight 33585.

CAPCOM That's all of Charlie, Al.

CAPCOM 12, Houston. The computers yours.

SC Roger.

END OF TAPE

PAO This is Apollo Control at 29 hours 16 minutes. We're a little less than 1 minute away from the time when Apollo 12 will be equal distance between the Earth and the Moon. At 29 hours 16 minutes 53 seconds. Apollo 12 will be 112 899 nautical miles from the Earth and from the Moon.

PAO Mark equal distance. And the velocity is 4470 feet per second. Midcourse correction number 2 will be performed at an elapsed time of 30 hours 52 minutes 44 seconds. Duration of the service propulsion system burn will be 8 point 8 seconds. DELTA V 61 point 7 feet per second. This maneuver will take Apollo 12 off the pre-return trajectory, put it on the hybrid trajectory. And make it's closest approach to the Moon if it does not burn Lunar Orbit Insertion 60 nautical miles on the prereturn. Apollo 12's closest approach was approximately 1800 nautical miles. However, on this hybrid trajectory, closest approach without Lunar Orbit Insertion will be 60 nautical miles.

CAPCOM 12, Houston. You want some more ball scores, Dick, or are you busy?

SC Go ahead.

CAPCOM Okay. Sorry, Pete, it didn't work. The final score was Yale 17, Princeton 14. And for Al, Texas is leading TCU at the half 24 to 7, Washington, they haven't started on the West Coast. In the fourth quarter, fourth quarter that is, Pitt is leading Army 12 to 6. Dave's next to me, he just cringed at that. The final, Penn State beat Maryland 48 to nothing. Final, Houston beat North Carolina State 34 to 13. Here's a big one. In the third quarter, Mississippi is leading Tennessee 31 to nothing. The final in the Ohio State - Purdue game, Ohio State on top, 42 to 14. Minnesota beat Michigan State 14 to 10. In the first quarter Arkansas' leading SMU 14 to 12. At half Rice is leading A&M 7 to nothing. And that's all we have for now.

SC Okay. Appreciate it very much. Thank you.

PAO And Dave Scott the backup crew commander has joined Paul White at the CAPCOM console. Dave who cringed at that score, is a graduate of the Military Academy.

END OF TAPE

CAPCOM Hello, Houston, you are GO for MCC-2.
SC Apollo 12. Roger.
SC Houston, Apollo 12. The map of CSM
DELTA P is plus .7.
CAPCOM Houston. Roger.
CAPCOM 12, Houston. I've got some high gain
angles for you for the burn.
SC Okay, Houston. GO.
CAPCOM Okay. That will be PITCH minus 85,
YAW plus 28, and when you get to the burn attitude will you
give us narrow beam width, please.
SC J PITCH minus 85, YAW plus 28 and when
we are in the burn attitude, go to narrow beam width.
CAPCOM Roger.
SC And soon as we roll around on this one
in the ready roll angle, we will be going into the P52,
Houston.
CAPCOM Houston. Roger.
CAPCOM 12, Houston. Give us OMNI BRAVO, please.
CAPCOM Hello, 12, Houston. Over.
CAPCOM Hello, Apollo 12, Houston. Over.
SC Go ahead, Houston.
CAPCOM Okay. On this - you've got a pretty
tight LM and it is going to have to be purged some. We've
got two options.

END OF TAPE

CAPCOM Okay, on this - you have a pretty tight LM and it is going to have to be purged some. We have got two options. The flight plan calls for a CSM purge at 36 hours. The other option is to vent the LM down now. Instead of doing that the pros and cons are that the cabin purge - the CSM cabin purge takes longer - and does slightly perturb the postburn tracking. Now, all of these things being equal and if it meets with your approval, we would like to request that you vent the LM down now. Over.

S/C Okay. Roger. How far do you want to vent it.

CAPCOM This is Houston. You are broken. Say again.

S/C How far do you want it vented?

CAPCOM Okay. We would like to vent to a Delta P to about 1.5 to 1.6. This should take about 30 to 45 minutes to go from the present 0.7 to those values. Over.

S/C Houston. Okay, are you looking at the DSKY?

CAPCOM That's affirmative.

S/C Okay. There's the torquing angles. Do you copy?

CAPCOM We have only got one so far. There they come. We have them Dick.

S/C Okay. Torquing on my mark. Mark.

CAPCOM Got it.

CAPCOM Apollo 12. Houston. I have a status report on the Phoenix 200 if you want it Pete.

S/C Okay.

CAPCOM Okay. Al Unser is leading after 59 laps. Mario Andretti is second. Bobby Unser is third. A. J. Foyt was forced out of the race. My information doesn't indicate when. He was running with the leaders then his car was damaged in a collision. There were no injuries.

S/C Roger.

PAO This is Apollo Control at 29 hours, 55 minutes. Apollo 12's distance now is 114,559 nautical miles, velocity 4,405 feet per second. We are 56 and 1/2 minutes away from the midcourse maneuver and we should have television coverage during this maneuver. We are scheduled - the start of TV is at an elapsed time of 30 hours, 25 minutes. That's 4:47 PM central standard time. We will have the capability to pick up slightly earlier than that and that if the crew decides they would like to come in a little early as they did yesterday.

S/C Houston. Apollo 12. The lithium hydroxide cannister change out has been done on time.

CAPCOM Roger 12. Thank you and your platform looks real good. No updates.

S/C Okay.

CAPCOM Apollo 12. Houston. A hot flash on the Phoenix 200. Al Unser and Mario Andretti collided with each other and Bobby Unser is now in the lead.

S/C Okay. Very good.

PAO This is Apollo Control, Houston, at 30 hours, 4 minutes now into the flight of Apollo 12. We're apparently having a change over in flight control teams in Mission Control. At the present time Pete Frank is manning the flight director's console replacing Gerry Griffin and members of his orange flight control team are taking their places at their respective consoles. As was reported earlier, midcourse correction 2 is currently scheduled for ground elapsed time of 30 hours, 52 minutes, 43 seconds. This is done with service propulsion system engine. Time of burn - or burn duration - 8.8 seconds. Before this burn, Apollo 12 will be yawing around 168 degrees making the burn itself close to retrograde. Without the burn, or if we did not do this midcourse correction 2 burn, the point of closest approach for Apollo 12 with the moon would be 714.9 nautical miles. With this -

CAPCOM Update on the Phoenix 200 - That collision was between Mario Andretti and Bobby Unser. Al Unser still has the lead.

S/C Okay. Very good. You know how far along they are in the race?

CAPCOM No, we don't know right now. We will get it for you.

S/C Okay.

PAO With the burn itself performed as programmed, it should bring Apollo 12 within 16 nautical miles as a point of a closest approach to the moon. At 30 hours, 6 minutes into the flight of Apollo 12, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston at 3 hours 10 minutes now into the flight of Apollo 12. We currently show the Apollo 12 spacecraft at an altitude of 115 165 nautical miles above the earth. Its velocity now reads 4382 feet per second. At Mission Control Center we're currently configured for receipt of our next television transmission which is nominally expected some 15 minutes from this time. This is Apollo Control Houston standing by.

CAPCOM 12, Houston. Could you give us a readout on the LM Command Module DELTA P now, please?

SC Okay, just a second let me go up there. I had a clock running for a while and I was just going to check it in a minute.

CAPCOM We just want to get a hack on the rate.

SC Okay. It's about 1.25 to 1.3 right now.

CAPCOM Roger, understand. And here on the ground we're configured for TV.

SC Okay. We're just setting it up in here, and we'll go back to the LM tunnel thing, you want to go to 16 right?

CAPCOM That's affirmative. Between 1.5 and 1.6.

SC Okay. It's back at vent.

CAPCOM Roger.

SC Houston, you want the TV, now?

CAPCOM Stand by, Pete.

CAPCOM While we're getting a reading on the TV, Pete, they stopped the race in Phoenix after 84 laps because of rain if you can believe it, and they're going to wait a while and then restart when it slacks off.

SC Okay, thank you.

PAO This is Apollo Control, Houston, 30 hours 15 minutes into the flight of Apollo 12. Jerry Carr is in the Mission Control Center now replacing Paul White as our capsule communicator. Meanwhile, we're standing by for receipt of television transmission in just about any time. At 30 hours 15 minutes into the flight this is Apollo Control, Houston.

CAPCOM 12, Houston. We're ready for a TV whenever you are Pete.

SC Okay. We'll be coming at you in just a second.

CAPCOM Roger.

PAO Apollo Control Houston. You heard that response from commander Pete Conrad indicating that they should be coming at us with the television.

SC We're giving you the TV. We'll be coming up VOX and we'll let you watch what happens during the burn.

CAPCOM Roger.

SC We're giving you the TV.

PAO We're receiving television, now.

END OF TAPE

SC We're giving you the TV.
CAPCOM We're receiving television now.
SC Watch what happens to during the burn.
CAPCOM Roger.
SC Okay, guess I'll open the box now.
I've got to stow this helmet storage bag (garbled)
CAPCOM Okay, Dick, I don't think your VOX is set
quite right yet.
SC (garbled)
CAPCOM Okay.
SC Let me get the big book.
CAPCOM Burning check burning RC 2 minutes 43 point
68 seconds.
CAPCOM Plus 5.
SC Okay.
SC Got the TV yet, Houston.
CAPCOM Roger, 12. Looks beautiful.
SC Okay, we're just going through the preburn
checklist at this time. Al's down in the bilge stowing some
gear for the burn. Dick's in the lefthand couch and I'm in
the center couch right now and we have the TV mounted so that
you can watch the instrument panel and the switches on.
CAPCOM Roger, Pete.
SC Okay, let's see. The clock's in sync now.
They're in sync 34, 27 - Houston do you want us to run the
tape recorder during this TV or not?
CAPCOM Standby.
SC We're concerned about the high bit rate while
operating the TV.
CAPCOM 12, Houston. Better run the tape just during
the burn.
SC Okay. Al, we the automatic stop on. Would
you take the monitor and put it someplace for a second and
Dick, hand me the - put it over here - hold these so I can go
up and check the DELTA P in the LM again. Okay. Yes. Okay,
we've got just a little bit to go.
SC Got all your shoulder straps tucked away where
they won't go anywhere?
SC We are at 1 point 4 on these. Water.
SC Need a drink of water, Dick, got that?
SC Okay.
SC Well, let's see we got to do something with
the water gun. Let's stick her down here. Can't.
SC With that thing on, can you.
SC Uh-uh. Not unless it would go in backwards,
which it will. Super.
SC There you go.
SC I'll hold on to (garbled) you got to shut off
the vent a minute anyhow.
SC We're almost there.

SC If the first storage bag falls off the wall,
we're going to have garbage all over the place.

SC Okay.

SC Okay. Got the DAP all loaded.

SC DAP loaded. (garbled)

SC Control power two up, AC/DC.

SC AC/DC.

SC (garbled) and we several choices, we can go
to B40 or we can sit where we are or we can over to P00.

SC Might as well sit here for a few minutes.
Watch the clock.

SC Test the TV monitor (garble) put it out of the
way.

SC Check that DELTA P.

SC No, not quite.

SC Okay, now weren't we flowing from open before.
Wonder why we're doing it now.

SC We haven't opened anything. You got any of the
vents open down there, Al?

SC I don't think so. I don't think we're flowing
anything. Everything's closed in here. The DELTA P.

SC No, it's in tunnel vent, I'm venting the LM down.

SC No (garbled) as far as I can see.

SC Boy, you just may be making up some the cabin.

SC Do you see anything loose, Al?

SC No, I think everything's stowed.

SC Very good.

SC Trouble is some of those things (garbled)

SC Okay, we got 30 minutes to the burn.

SC All righty.

SC Will you set us 10 minutes on your little
ding ding timer there, will you Al, next time, and put it
in the tunnel then so I don't forget it.

SC All right.

sc Don't want any circuit breakers to quit.
Preferred time is still 9 seconds to shut is burn time plus
1 (garbled) less than two.

PAO Apollo 12 now 115 735 nautical miles in alti-
tude. That's essentially Pete Conrad and Dick Gordon talking
back and forth within the spacecraft. That's Pete Conrad
wearing the bald cap that you're seeing on your screen.

SC We can do that right now. Okay, waste water
dump coming up. Hey, Al, you want to check - want to watch
the gage?

SC Okay.

SC And Houston we're going to dump the waste
water down to 25% at this time.

CAPCOM Roger 12 we're standing by.

SC (garbled) closed and I'm going to dump A.

SC A dumped.
SC You got 50 percent or rather 49.
SC Okay.
SC (garbled)
SC You got it.
SC Okay, I'm reading 1 point - Houston, I'm
reading 1 point 5 on the LM DELTA P now but I think
I'll let it go to 1 point 6 because the gage has about a
tenth error in it when it's equal.
CAPCOM Okay, Pete that sounds fine.
SC What's the water's doing, Al.
SC It's doing good. It's just down to about 45.
SC Okay. Say, how's the focus on the TV (garbled)
SC Hey, Houston, what do you think of the hats
our boss presented with us?
CAPCOM Ooh, we're -

END OF TAPE

SC Hey, Houston. What do you think of the hats our boss presented with us?

CAPCOM We were just going to ask you for a little fashion show here.

SC Well, we've got a space qualified beta clubs and all those good things.

CAPCOM Roger. Capcom has one, too.

SC Outstanding. Have you got a propeller on yours?

CAPCOM No. Just one guy's got a propeller.

CAPCOM I'm just like you guys.

SC How's the waste water, Al.

SC It's good.

SC How much is it.

SC 14 percent.

SC Okay.

SC It sure is raining outside.

SC It looks like a snow storm.

SC Okay. Did you mean to leave this storage box open?

SC (Garbled)

SC Okay.

SC Okay. Slip up into the tunnel and let's look at the DELTA P again. Just a smidge more. Okay.

SC How's the waste water?

SC Waste water is running about 31.

SC Very good.

SC If you will jump back in here we can get the checklist.

SC Okay, I will be right with you just as soon as the waste water is down and the LM is squared away and that's it.

SC 31 - it's down. Water is up at 95.

PAO In the mission control center at the Capcom's console there is a cap the same as the one Pete Conrad is wearing except it is identified on the bill as Capcom.

SC Okay. One cow back where it belongs.

SC Okay. That's 25 percent. Shut her down. Waste water now Pete.

SC Okay. Waste water coming off.

SC Pressure leaf is (garbled) back to 2, audible inlet is coming open.

SC Right.

SC That's it. Now, I want to square away the LM. That's good enough. It ought to be just about 1.6.

SC I'll get the stowage compartment.
SC There we go, LM. CM DELTA P and, Houston,
it reads now 1.6 exactly.
CAPCOM Roger. 12. You can terminate.
SC Okay. Let's put the pool over there.
SC There you go.
SC Okay.
SC (Inaudible)
SC Okay, Al. Let you have the pan
SC Okay. Want to cycle (Garble) and
bring everything up to speed.
SC GO.
SC P-40 and those angles look good, 3373
0952433252.
SC Okay. Let's GO there.
SC Alright. Gone on maneuver.
SC Yep. There it goes. This reminds me of
riding in a freight train.
SC Freight train, freight train. Go fast.
SC Okay, we're there. Burn attitude.
SC Now, you've got the 50 18 and AUTO.
We have checked the stars. Okay. I'll run the checklist
to minus 6 minutes.
SC Okay.
SC All right.
SC Channel 8 circuit breakers, do you have
control?
SC System 8 up closed. CBS DS 12 closed.
SPS 12 closed.
SC The DELTA VC is set, DELTA VC is set
to 57.2.
SC Roger. Let's verify. EMS function
DELTA V verified.
SC DELTA V verified
SC Manual at 3 up in rate command.
SC Rate command.
SC Limit cycle on.
SC Limit cycle is on.
SC At deadband (garble) rate low.
SC Rate's low.
SC Control power up and on.
SC Up and on.
SC SES DVC 2 up to rate command.
SC DELTA VC G Lm CSM.
SC LM CSM.
SC TVC gimbal drive, PITCH and YAW. AUTO.

SC PITCH and YAW. AUTO.
SC There we are. We're holding at 6 minutes.
SC We've got about 12 minutes to go, Al, to
BUS time.
SC How's that focus system?
CAPCOM Apollo 12, Houston. Focus is just a
shade fuzzy now. It was better earlier.
SC Okay. I'm an invisible man. How's that?
CAPCOM It's getting worse, now.
CAPCOM Now, you went through it.
SC Here I'll hold that for you.
SC How's that look now, Houston?
CAPCOM It's pretty good now, 12, it's still not
as good as it was at first.
SC Friendly tuning fork.
SC (Garble).
SC Yes. That's how I get around the space-
craft. I turn on my propeller.
CAPCOM Apollo 12, contact.
SC Roger, roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/15/69 CST 1658, GET 30:36, 99/1

PAO You can see the profile of Dick Gordon now. Meanwhile, we're 15 and 1/2 minutes away from scheduled time of ignition.

SC I'll hold this film?

SC Sure, just stick it up there somewhere.

SC Okay, I'll put it on the (broken)

SC Okay Houston. 15 minutes.

CAPCOM Roger 12.

SC Al, I'll give Pete back in about 3 or 4 seconds after the burn.

SC Okay.

SC It's only 9 seconds long.

SC Okey, doke.

SC Looks like that S-IVB really did the job yesterday, didn't it?

PAO Apollo 12 now 116 351 nautical miles above the earth.

SC Sure takes a long time for - whenever you dump anything, sure takes a long time for it to dissipate out there, really hangs loose.

SC Might mention to you Houston we've been all enjoying the soup very much. It's a lot better than Gemini.

CAPCOM Real good, Pete.

SC Nice to have hot coffee this morning.

PAO We're 12 minutes away now from scheduled time of ignition for midcourse correction No. 2 burn.

CAPCOM Apollo 12, Houston. I'll be giving you a 10 minute time hack in about a minute and a half.

SC Okay. Standing by.

SC It's a good move, Jerry with the way our clocks are up here.

SC Yeah. When Dick's up here by himself this mission timer we have on the panel 2, has been virtually useless. It changes time both plus and minus and its just not working at all. Right?

CAPCOM Roger.

SC One down the alley B, one down the alley B is keeping pretty good time.

PAO Apollo 12 now 116 500 nautical miles above the earth.

CAPCOM 30 seconds to go.

SC Okay.

SC It looks like we're pretty well infra-radiated.

CAPCOM I'm going to give you 1 second lead so it will be 10 when it gets there.

SC Okay.
CAPCOM Stand by for 10.
CAPCOM 2, MARK.
SC Right 10 minutes, we're right with you.
SC After the burn, we're going to clean up the spacecraft and I think the three of us will shave and then want to do some exercise for the exerciser and I suspect that will occupy most of the rest of the day.
CAPCOM Roger.
PAO Mid course correction 2 burn is scheduled to be 8.8 seconds in duration.
SC Get my hand out of the way here.
SC Holds the books up here.
SC Seems like those upper thrusters you can hear them fire, it's the lower ones that you can never hear.
SC I don't know what it is but some problem with the insulation on the QUAD supporting them.
SC I saw the tachometer they checked yesterday.
SC No, they were that way yesterday.
SC They were?
SC Yeah. It looks like you dropped a drop of oil on water. It's multicolored.
SC Yeah I noticed that yesterday.
SC (Broken) thrusters away.
SC I don't think so. I don't think we've been firing them that way. Might of done it yesterday.
SC It wasn't there at launch.
SC Or at testing.
PAO This is Apollo Control. We now read 30 hours, 46 minutes into the flight of Apollo 12 continuing to monitor these preparations for the midcourse correction 2 burn.
SC Okay. Coming up on 7 minutes and we'll pick up the checklist at minus 6.
SC Okay A1, we'll spring on buss ties - -

END OF TAPE

SC Okay, Al, let's bring on (garbled)
 SC (garbled)
 SC Okay, PTC Servo power 1 ac 1 main A.
 SC Over. 1 ac 1 main A.
 SC PTC servo power 2 ac 2 main B.
 SC 2 ac 2 main B.
 SC Roll control power normal 2 ac
 SC ac
 SC Roll control power direct 2 to off.
 SC Off.
 SC (garbled) 3 up amp 1 rate 2
 SC Amp 1 rate 2
 SC (garbled) ground control to SCS
 SC SCS
 SC Rotate ANT control to number 2 ARM
 SC Number 2 ARM
 SC Okay. Primary PTC check gimbal motors pitch 1
 yaw 1 start ON.
 SC Okay. Are you ready? Pitch 1 GO.
 SC Pitch 1.
 SC It's on.
 SC I got it.
 SC Yaw 1.
 SC 1.
 SC It's on.
 SC I got it.
 SC Okay. Verify trip control with SXT.
 SC (garbled)
 SC plus 96, minus 25, okay want to verify that, Al.
 SC I've got it.
 SC I have (garbled)
 SC You got (garbled)
 SC (garbled) 925, yeah.
 SC You've got MTVC, right?
 SC Right.
 SC Okay. Spacecraft control to CMC
 SC CMC (garbled) zero.
 SC Translation land controller clockwise.
 SC Clockwise.
 SC Verify no MTVC.
 SC No MTVC.
 SC Okay. Secondary PTC check. (garbled) pitch 2
 Yaw 2 START. Ready Al.
 SC Yeah.
 SC Pitch 2, Mark
 SC I got it.
 SC I got it.
 SC Yaw 2, Mark.
 SC I got it.

SC Okay. Set the GPI TRIM.
 SC TRIM set.
 SC Verified.
 SC Okay. Verify MTVC.
 SC (Garbled)
 SC Okay. Translation hand controller neutral.
 SC Neutral.
 SC Verify no MTVC.
 SC No MTVC.
 SC Verify GPI returns 00.
 SC 00.
 SC Okay. Roll control power 2 AC DC
 SC AC DC.
 SC Roll control power direct 2, MAIN A MAIN B
 SC MAIN A, MAIN B
 SC B MAG modes three rate 2
 SC Rate 2
 SC Proceed.
 SC VAMP
 SC Okay. That's complete. B MAG modes three up
 have 1 rate 2
 SC Have 1 rate 2.
 SC ENTER.
 SC ENTER.
 SC Okay. There's a 204, PRO.
 SC Gimble TRIM check
 SC Plus 2, minus 2.
 SC (garbled)
 SC Minus 2.
 SC (garbled)
 SC Okay. (garbled)
 SC Okay. You're standing by at 3 minutes 40 seconds
 in counting.
 CAPCOM Roger, 12, TRIM looked good here.
 SC Roger, Roger, Houston.
 SC Okay. Dick, FDAI scale 55.
 SC Scale 55.
 SC Limit cycles off.
 SC Limit cycles off.
 SC Rate high.
 SC Rate high.
 SC Update the DET.
 SC DET is right on.
 SC Okay. Standing by for 2 minutes.
 PAO Two minutes 30 seconds from time of ignition.
 SC Okay, there's 2 minutes, Dick. DELTA-V thrust A
 to normal.
 SC DELTA-V A is normal.
 SC Translate for a hand controller ARM.
 SC ARM

SC Rotational hand controller ARM. Al, STS helium
valves 2 up AUTO.
SC They're AUTO.
SC Let's have it high bit rate record forward
command reset.
SC Command.
SC Standing by for 35 seconds.
SC Helium and nitrogen okay.
SC Alright.
SC Mark 1 minute.
SC Sit over here where I can watch the clock for you.
SC Average GEMS normal
SC GEMS is normal.
SC Okay. There is no ullage.
SC You're clear to proceed in 5 seconds.
SC Standing by on a PRO.
SC 10, 9, 8, 7, 6, 5, may I see 99 0 2 1 ignition
(garbled) 3, 4, 5, 6, 7, 8, 9, (garbled) B banks, A banks off.
SC Touchdown (garbled)
SC Very good.
SC Okay Yaw 2 is OFF. Pitch 2 OFF. Yaw 1 OFF.
Pitch 1 OFF. Dick?
SC Okay. Let me run a checklist, now.
SC Moves out doesn't it?
SC Yep. DELTA-V A and B switch is OFF.
SC They're OFF.
SC SPS check your valves all closed.
SC They're closed.
SC STS helium valves all closed, right.
SC Gimble motors 4 of them off. They are all off.
SC Servo power 1 and 2 off.
SC 1 and 2 off
SC Okay. Main bus 2 of them off.
SC Off.
SC And there's the - okay. Minus 1, minus 3
SC (garbled)
SC Yep, yep. That's it, Dick's minus a tenth.
SC (garbled) the MS reads minus 2.2.
SC Okay. You got the bus ties off.
SC They're off.
SC Okay. No residuals. It was stud and did you
give the EMS counter?
SC Yep.
CAPCOM That's affirmative. We copy.
SC EMS function, okay EMS modes stand by.
SC Stand by in off.
SC Limit cycle ON.
SC Limit cycle ON.
SC TRANS control power OFF.

SC TRANS control power OFF.
SC Roll control power direct 2 of them OFF.
SC Direct 2 OFF.
SC B MAG modes three under rate 2
SC Rate 2.
SC A1, PCM bit rate low.
SC Okay.
SC We done that.
SC (garbled)
SC Hello, Houston.
CAPCOM Go ahead, 12.
SC Single bank nominal SPS chamber pressure was 90.
Dual was 95. Over.
CAPCOM Roger. 90 and 95.
SC That's affirmative on the (garbled) gage.
SC Okay. (garbled). Houston.
CAPCOM Go ahead, 12.
SC Let's see we have a GO to VERB 66 the state
vector.
SC Well that was nice to get in touch with Gene
again. Nothing came off the fueling so we must have (garbled)
SC (garbled) front of us.
SC That ran pretty good together, didn't it?
SC (garbled)

END OF TAPE

S/C Boy, that ran pretty good together, didn't it?
Started to (garble). All right. Houston, do you want
anything else?

CAPCOM Want the burn status report.

S/C Are they locked up yet?

CAPCOM Apollo 12. Houston. Doesn't look like we
need anything more. We will poll the room here. Stand by.

S/C And how does that engine look, Jerry, to the
gentlemen down there.

CAPCOM It looks very good and we don't need anymore
information.

S/C Roger. Thank you.

CAPCOM Okay, Dick. Let's grab the checklist and go
to PTC.

S/C I'm slowly maneuvering back there. LM pulse
PTC attitude.

CAPCOM Okay. Put the flight plan here. Al,
while we are doing it why don't you grab the camera and
switch it around here.

S/C Okay?

S/C Garble.

S/C Did you copy my residuals Pete? I think they
probably seem - did you copy the Y residuals, Houston?
Minus 3, 2. Yeah. Yeah.

CAPCOM Affirmative 12. We copied them all.

S/C Okay.

S/C (Garble) switches on the hatch and (garble)
Shines out there on the window anyhow. That's a TV screen.
(Garble) What you are seeing is a reflection of the
fluorescent lights in the window. I couldn't figure that
out for a minute. We turned one of them down. He
has been saying that we probably had a friend flying along
with us. See all those particles floating round, Houston?

CAPCOM Sure can. Looks like a snow storm.

S/C I did wonder where all of them came from but
I was watching the LM last night as it was coasting along. It
was a lot of small pieces of white material. It was all over
the LM and I assume it's all over the other parts of the
spacecraft and (garble) the burn something like that -
burn something loose. I think what that is Al, is ice from
these water and urine dumps and everything that has collected
on it and we shake them loose again. Could be.

CAPCOM 12. This is Houston. Al, your mike must be
away from your face a little bit too far. You are kind of
hard to read on VOX.

S/C Okay. (Garble) Say Houston, do you have any
words on what may have happened to our helium - excuse me -
our RCS - RCS gage - propellant quantity gage? You

SC apparently have - do you have TM on the ground or you just taking this for pressures and temp - helium pressure temp?

CAPCOM Negative, Pete. We don't have TM on that on the ground. We're using pressures and temperatures to figure to figure it.

S/C Okay. Do you want the PTC checklist?

CAPCOM 12. Houston. Our TM is showing the same thing you're saying off scale high.

S/C I see. Understand.

S/C Well, let's turn A and B off again for 20 minutes to stabilize. Do you concur Houston?

CAPCOM Stand by, 12.

S/C (Garble) Yeah, he said he concurred.

S/C Okay. Quads A and B are off. We'll sit here and stabilize.

CAPCOM Okay 12.

S/C Well, that's one done. We only have five more to go. That's right.

PAO Apollo 12 now 117,311 nautical miles in altitude.

S/C You know what you are getting now? You are getting - you hear those thruster firing. We are getting a little propellant slosh I bet you. Could very well be. It sure is taking a while to settle down. I wonder (garble) GDC. Yeah, we ought to run a (garble) check on that and find out if its (garble) seems to be - not only YAW but PITCH.

PAO Apollo Control, Houston. 31 hours, 3 minutes now into the flight of Apollo 12. MCC 2, the burn, was some 9 seconds in duration. A preliminary evaluation following this burn would put Apollo 12's point of closest approach to the moon at 64 nautical miles.

CAPCOM Okay, 12. You guys are looking real fine. That was a nice burn.

S/C Okay.

CAPCOM Our compliments to your camera man.

S/C Okay.

PAO We have lost our television picture at this time. We now read 31 hours, 4 minutes into the flight of Apollo 12. Coming up momentarily in the MSC News Center, will be a change of shift briefing with Flight Director, Jerry Griffin and Capsule Communicator, Paul Weitz.

S/C 12, Houston. We are starting the data dump.

CAPCOM Apollo 12, Houston.

S/C We copy, dumping now.

CAPCOM Roger.

END OF TAPE

SC Houston, we're planning to take a dump
now, is that okay?

CAPCOM Say again, 12.

SC We're planning a urine dump, is that okay?

CAPCOM Yes. No problem, 12, go ahead.

SC Roger.

PAO This is Apollo Control, Houston, at 31 hours,
8 minutes now into the flight Apollo 12. The change of shift
news conference is due to start in the news center at approxi-
mately 2 minutes. We will be taking down the live air-ground
at this time and we'll tape and play back as soon as the change
of shift news conference has been concluded. This is Apollo
Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 31 hours, 34 minutes now into the flight of Apollo 12. Apollo 12 is currently 118 620 nautical miles away from earth. It's velocity now reads 4235 feet per second. During the change of shift news conference we had brief conversations with the Apollo 12 crew and we'll play that tape for you now.

CAPCOM Apollo 12, Houston, did you do a fuel cell 02 purge before the burn?

SC Don't think we did.

CAPCOM Okay, we'd just as soon you delay it until your next opportunity at 40 hours.

SC 40 hours. Thank you. We're sorry we missed that.

CAPCOM No sweat, 12.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. It looks like rates are low enough to start TPC, but we noticed your CMC mode switch is in hold position and you should be in AUTO.

SC Okay. There she goes, Houston.

CAPCOM Roger, 12.

SC Houston, this is 12. Do you want us to save all jets or just work in at this 30 degree deadband until sleep period?

CAPCOM 12, Houston. You can turn them off now, if you want to.

SC Okay. I'm just saving a couple that may fire on us or something, huh.

CAPCOM Roger.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. Go S-band antenna to OMNI and OMNI BRAVO.

SC Roger. OMNI, OMNI BRAVO.

PAO This is Apollo Control, Houston. Although we are looking at a relatively blank flight plan for the remainder of the evening and expect a quiet evening, we will leave the release line up live at least for awhile. If we continue to have long intervals between conversations with the crew, we will take the release line down and play back the tapes at periodic intervals. At 31 hours, 37 minutes into the flight, this is Apollo Control, Houston.

SC Houston, 12.

CAPCOM 12, Houston, go.

SC Roger. Battery vent is - battery compartment has been vented and we started Bat A at 3137.

CAPCOM Roger, Pete.

SC Houston, we just got a master alarm with nothing on the panel. Got any idea what that might have been?

CAPCOM Stand by, 12, we'll start checking.

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM Roger. We don't see much out of the ordinary, Pete. We are on a low bit rate right now and we will be in high bit rate shortly where we can look at things a lot more closely. The only suspicious item is that your O2 flow rate is just a shade high but we see nothing else.

SC Okay. We are venting the urine system, that new one. We are just letting it run. I'll go shut it off.

CAPCOM Okay, Pete.

SC Looking at the earth down there, Houston. It looks like you are littler than a golf ball at arm's length now. Sure looks pretty though. The terminator looks like it is - it's kind of hard to tell from this distance. It looks like it is passing somewhere just west of Tallahassee.

CAPCOM Roger, Pete. It is just getting dark out here now.

END OF TAPE

CAPCOM Apollo 12. Houston.
S/C Go ahead.
CAPCOM Roger. Your accumulator cycled just about the time you got that master alarm so it may have been an O2 flow high and you may have just had a flicker on your matrix panel.
S/C Okay.
PAO This is Apollo Control, Houston, at 31 hours, 48 minutes now into the flight of Apollo 12. We currently read a velocity on Apollo 12 at 4214 feet per second. Its present altitude 119 204 nautical miles.
S/C Apollo Houston, we have settled down to a normal routine during the day (music in background).
CAPCOM Roger, 12. We will have some scores for you shortly.
S/C Houston, do you read 12?
CAPCOM 12, Houston. Reading you loud and clear on voice.
S/C Roger. Did you get the transmission a little while ago?
CAPCOM We got a few words and a little bit of music and then it quit.
S/C Okay. I think you lost our antenna about then. We are trying all these things we didn't have in Gemini, like toothpaste and shaving - we are really having a ball up here.
CAPCOM Roger. All dressed up and no place to go.
S/C Oh, we're going someplace. We can see it getting bigger and bigger all the time.
PAO Apollo 12 Houston, at -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11-15-69, GET 320400, CST 1826 105/1

CAPCOM Apollo 12, Houston, I have a little sports news for you.

SC Okay.

CAPCOM Roger. The Phoenix 200 is still in a hold status. They apparently couldn't get past the thunder storms. And here is -

SC Uh -

CAPCOM Go ahead

SC No. Go ahead.

CAPCOM Roger. Some scores. Texas Tech 41, Baylor 7. These are all finals. Texas 69, TCU 7; Arkansas 28, SMU 5; Rice 7, the Aggies 6; Northwestern 30, Indiana 27; Michigan 51, Iowa 6; Wisconsin 55, Illinois 14; Ole Miss 38, Tennessee 0; Missouri 40, and Iowa State 13. The scores on the west coast are starting to come in now. Dick, you will be happy to hear Washington and Southern Cal are tied 7 to 7 in the third quarter. Oregon is in the third quarter and is ahead of UCLA 10 to 7.

SC Jerry, it makes me happy, but I bet it doesn't make you happy, does it?

CAPCOM Game's not over, Dick.

SC We have been trying to look at the United States through the monocular and it just looks like most of the state is covered with clouds. Are you having bad weather generally over the country?

CAPCOM We'll have to take a look at an over-all map, but here in Houston it's been CAVU all day and beautiful. A wonderful, clear fall day.

SC Okay.

CAPCOM 12, Houston. Dick, I've got bad news for you. Final USC 16, Washington 7.

SC Boy, you sure changed that in a hurry, didn't you?

CAPCOM I didn't want to give you too long to gloat over that one.

SC You're sandbagging me, Jerry, I was about to bet you.

CAPCOM I should have waited.

PAO This is Apollo Control, Houston. We currently show Apollo 12 at an altitude of 119 954 nautical miles.

CAPCOM We have a weather map here for the United States. All up through the northeast part of the country it looks like it is either overcast or broken and in the southeast and in the south and up through the panhandle of Texas down into Florida it is all clear and in moving up further west, you get into New Mexico, Arizona, California and you begin to pick

CAPCOM up overcast skies again. All the way from Montana all the way down to Arizona. Montana has a few broken and scattered clouds in the eastern side and it is pretty bad over on the western side.

SC Yes, we are having a hard time picking out exactly where we were looking at. Even with the monocular everything is now - tends to be brown. We are having a hard time picking out the lands from the water, but it seems like that part of the country that we can see is pretty well covered with clouds.

CAPCOM Roger. It looks like the whole west coast is socked in.

PAO This is Apollo Control.

CAPCOM And the weather system is a great big high sitting down over Gulfport, Biloxi, area so that is why we are so clear down in the southeast. We have a weak high up around the four-corners area of Utah, Colorado, New Mexico and Arizona. Everywhere else is just bad news.

SC I see.

SC How are our families doing, Jerry?

CAPCOM Haven't talked to them, but I will make a few calls and give you some answers.

SC Okay. Appreciate that everyday. It's good.

CAPCOM Will do it. Everybody is probably at supper right now, so will probably catch them all at home.

PAO This is Apollo Control, Houston. We are at 32 hours, 10 minutes into the flight.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, 18:36 PM,CST, GET 32:14:00 106/1

S/C Houston. We are just looking out of the window now and we were all talking about old project "FSMOE". Do you remember that?

CAPCOM I guess that one doesn't compute, 12.

S/C Say again.

CAPCOM That one doesn't compute.

S/C Project "FSMOE". Full scale mockup of earth.

CAPCOM Roger.

S/C Hard to tell which we've got out the window.

CAPCOM Is it blue or grey?

S/C Pretty blue and white.

S/C Hey did you hear, somebodys probably said this before, but that place looks like an oasis down there.

CAPCOM Roger, Dick.

PAO This is Apollo Control, Houston, at 32 hours, 17 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft at this time, 120 348 nautical miles above the earth. It is now traveling at 4172 feet per second. At this time we will take down the live release line and come up at periodic intervals with taped replays. We expect relatively quiet period with regard to conversation between our capsule communicator, Jerry Carr, and the crew. At 32 hours, 18 minutes into the flight of Apollo 12, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, 19:09 PM,CST, GET 32:42:00 107/1

PAO This is Apollo Control, Houston, at 32 hours, 42 minutes now into the flight of Apollo 12. Since our last report, we have had no further conversation with the Apollo 12 crew, no doubt who are relaxing at this time after an active day and half in space. Mission Control Center now at this time, they - what would appear to be a somewhat powered-down mode. Very little activity aside from the individual flight controllers looking at their displays; perhaps one or two having sandwiches being brought in to them. At present we show an altitude above the earth for Apollo 12 at 121 393 nautical miles. Apollo 12's velocity now reads 4134 feet per second, and at 32 hours, 43 minutes, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 33 hours and 9 minutes now into the flight Apollo 12. At present the Apollo 12 spacecraft is 122 405.6 nautical miles above the Earth. Its velocity steadily decreasing now reads 4098 feet per second. Since our last status report of some 20 minutes ago we've had only brief conversations with the crew of Apollo 12. We'll play those conversations for you now.

SC Houston, 12.

CAPCOM 12, Houston. Go.

SC What's your preliminary look at the midcourse show?

CAPCOM Stand by a second, Pete. We'll get up the answer. We've got some nice, warm words for you on your SPS burns. Evaluation shows that your ISP is in within 1/10th of a second and your thrust is in within 20 pounds on that engine so you've got a real hummer there.

SC Very good.

SC I guess we can thank Mr. Thibodaux for that one.

CAPCOM Roger.

SC Jerry, it says in the flight plan to perform housekeeping. We're having a devil of a time finding a housekeeper up here.

CAPCOM Who's the junior man, Dick?

SC He's on the exergenie right now. He thinks he made Captain already, but he's got a surprise.

CAPCOM Roger. Your next midcourse looks like about a foot per second.

SC Okay. So I guess maybe we won't need to do any of those.

CAPCOM Roger. Looks real good from here anyway. Another little gem of wisdom we got for you here. When you entered PTC you collapsed your deadband when you used VERB 37 enter to get the POO so just this little helpful reminder, and we want you to remember that when you come out you're going to VAMP to your NOUN 22 attitude as soon as you activate your jets unless you come out of SPS.

SC Okay. Understand.

CAPCOM We figured you already knew it, but we wanted to show you how smart we were.

SC Good, thank you.

SC Houston, 12. What do you think now? I just redid a VERB 79.

SC Will that do it?

CAPCOM Roger. You just cured it.

SC Okay. I guess we called a P21 in there or something. We got curious to see how far out we were and must have collapsed it.

CAPCOM That's affirmative. That's what you did.

SC Okay.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger, Dick. You listening?

SC No Dicks' not on the horn.

CAPCOM Okay. How about Al. Is he listening?

SC (garbled)

CAPCOM Okay, Al. I checked home for you and Sue got back this afternoon from the Cape. She said to say that yesterday was a pretty exciting day for her, kind of wet, too. And she wanted to let you know that she had attended a birthday dinner party that was honoring Vice-President Agnew yesterday and had a real fine time. She says her mom and dad are there with her at home now. They just finished dinner and the kids are headed for bed and she wishes you God speed.

SC Thanks, Jerry.

CAPCOM Okay. Pete, I guess Jane and the boys are -

SC I'm up now.

CAPCOM Pete, I guess Jane and the boys are out to dinner. I haven't been able to get ahold of them yet. And Dick, you up.

SC Go.

CAPCOM Okay. Barbara says that Barb and Norman and your mother are all there now and everybody is doing fine, and they've had enough excitement for a while, thanks. If you don't mind they just soon you lay off the spectaculars.

SC Why? What in the world has happened?

CAPCOM Because Aunt Dorothy is passing through Houston, now, and she called and said hello and she said also to let you know that Bill Der Bing is there with them and he's doing a great job.

SC Very good, thank you.

PAO This is Apollo Control, Houston. The Mr. Thibodeaux who is thanked very early in that exchange by Pete Conrad is Mr. Guy Thibodeaux who is the Chief of the power and propulsion division at the Manned Spacecraft Center. The reference was an obvious reference with regard to the performance of the engine on midcourse correction 2. Bill Der Bing who is referred to later in Jerry Carr's report is also an MSC employee who is a member of the special events office of the Public Affairs. At 33 hours 15 minutes into the flight this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 33 hours, 29 minutes now into the flight of Apollo 12. Our displays in Mission Control now show the Apollo 12 spacecraft at an altitude of 123,206 nautical miles above the earth and now traveling at 4069 feet per second. Since our last report, we have had conversation with Apollo 12. We will turn to that conversation and you will hear Commander Pete Conrad describing the spacecraft window.

S/C Hello Houston, 12.

CAPCOM This is 12, Houston. Go.

S/C Say you know yesterday we talked to you about this stuff that is all over the windows, and on Dick's rendezvous window - window 2 - there is some kind of white deposits like a - i don't know - like an ash and it is not flush on it. It is built up in little humps and tabs of it sticking out on it especially in the upper right-hand corner. What we would like to do is photograph this for you. We don't have much to do right now. We thought we would photograph these windows and thought maybe you would come up with some recommended settings and everything. It seems to me I remember somewhere we had those procedures for photographing windows back in D or something because they were bad.

CAPCOM Roger, Pete. We'll get somebody going on that right away.

S/C We expect this stuff will be long gone after reentry.

CAPCOM Roger. We have been kinda dying to ask you too about the ice situation. How long did it take that stuff to sublime off?

S/C Well now that's a funny thing. The ice has sublimed off but it has left a white deposit all along the perimeter of the number 1 window that's on the black surface of the outside of that window and it is up along side of the window too. It is similar to the same stuff that is on the rendezvous window. Now the ice that was on the inside of the outer pane in the number 1 window - that sublimated too since we started the PTC. We have a fine deposit of water droplets whatever was in the water has adhered to the window and that's all in streaks and dots and splatters, so we kinda think some of this made up when the tower was jettisoned, we are not sure and I guess what we want to do is try to photograph this as best we can so (garble).

CAPCOM Roger, Pete. How long did it take for that outer layer of ice on window 1 to sublime? How long was it before it was gone?

APOLLO 12 MISSION COMMENTARY, 11/15/69, 19:50 PM,CST, GET 33:29:00 109/2

S/C It didn't go until we were finally asleep last night. We stopped looking at it. It was still there, I think, when we went to bed last night.

CAPCOM Roger.

CAPCOM Apollo 12. Houston.

S/C Go ahead Houston.

CAPCOM Roger. The polls are closed now and as soon as we get enough election results to give you a meaningful information here, we will run you up some returns.

S/C Okay.

CAPCOM Apollo 12. Houston. I am going to go out and get a bite to eat right now and your friendly AFD is going to be monitoring the line for you.

S/C Roger, Roger.

PAO This is Apollo Control, Houston. The election results referenced by CAPCOM, Jerry Carr, are from the Houston city elections. We will try to pass these along to the crew sometimes later this evening and as you heard in that last comment, Jerry is now out of the mission operations control room grabbing a bite to eat. At 33 hours, 34 minutes into the flight, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston at 34 hours and 4 minutes now into the flight. The Apollo 12 spacecraft is presently 124 563 nautical miles away from earth. Its velocity, continuing to decrease and now reading 4022 feet per second. Since our last report, we've had only brief conversations with the crew and we'll play them for you now.

CAPCOM 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. I've got some work for you on the camera setting.

SC Okay. Wait one.

SC Okay Houston. Go ahead.

CAPCOM Roger. Step No. 1. Make sure the sun is incident to the window but not shinning directly into the camera. Step No. 2. Set the focus at 3 feet and do as best you can to hold your camera 3 feet from your target. Realizing that this focal length is pretty sensitive to the distance. And your shutter speed is 1/250th and if you don't have a spot meter out use a F stop of 5.6 and take a picture of each window and then go to an F stop of 4 and take one of each window. And if you do have a spot meter out and want to use that, then the only caution here is to be sure that the spot meter is focused on the window or the target itself.

SC Understand Houston.

CAPCOM Apollo 12, Houston with some election news.

SC Go ahead.

CAPCOM Okay. About 10 percent of the votes are in and counted now and Mayor Louie Welch is leading his nearest contender who is Curtis Graves by 10 000 votes to 3000. These are approximates. In the 6 City Council positions that are up for grabs, all the incumbents are leading at this time and the housing code question in Houston is running about 3800 for and 6200 against.

SC Okay. Thank you.

PAO This is Apollo Control Houston. The photo settings passed up were to allow the photography of the white deposits around the spacecraft windows. That was Al Bean talking with Capsule Communicator Jerry Carr.

PAO We've just picked up another conversation with the Apollo 12 crew and we'll play that for you very shortly.

CAPCOM 12, Houston.

SC Go ahead, Houston.

CAPCOM We have a - some little bits of information here on the P23 that you've done so far. Also it generated a few questions that we'd like to ask. The first batch

CAPCOM that you did showed a DELTA H of 49.2 kilometers and the second batch showed 24.8 kilometers and the MARK that you took in each batch, in each set, were consistent. And the uncertainties both times were about 4 kilometers, so we've got 4 questions to ask you which might possibly help us decide which DELTA H to use. Over.

SC Go ahead.

CAPCOM Okay. The first question. Did you notice any difference between the horizons on the two batches. In other words, did you select a new horizon the second time?

SC Absolutely. On the first one they used a haze layer. On the second one, the haze layer was hardly discernable used what I considered the true looser light.

CAPCOM Okay Dick and the second question is - well you've answered the second question essentially. We wanted to know if you used the same technique or did you put the star below or above the upper part of the horizon, but that's answered. Next, is - were the stars - -

SC I'll tell you the reason I - -

CAPCOM Go ahead, Dick.

SC The reason I did that the second batch the haze layer was hardly discernable at all at the earth's sphere was so sharp at that point that I used it.

CAPCOM Okay then Dick. Then, I guess you're saying then that you liked the second batch better than the first batch. Is that affirmed?

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM Okay. Did you get my last question, Dick? I'm assuming that you liked the second batch better than the first batch then.

SC That's affirmative, it was much sharper, much easier to define the horizon on the second batch.

CAPCOM Roger, Dick. We kind of got the impression that the altitude seemed to be a function of the star of magnitude and we're wondering where the star image is pretty well focused.

SC That's affirmative. Didn't seem to notice that. The only thing I can say about the first batch is that they were at the very top of the haze layer where it just starts to turn a very light blue and I thought it was a lot further away than I expected it to be.

CAPCOM Roger Dick. And last question, was there any noticeable stray light and was it different on each batch?

SC No. The optics appeared to be excellent

APOLLO 12 MISSION COMMENTARY, 11/15/69, CST 20:25, GET 34:04 110/3

SC I didn't have any problem with stray light whatsoever.

CAPCOM Okay. Thank you, Dick.

PAO This is Apollo Control Houston. That was Dick Gordon critiquing with Jerry Carr the program 23, the star sighting navigation program onboard the spacecraft. We're now at 34 hours 12 minutes into the flight and we show Apollo 12 registering at an altitude of 124 872 nautical miles. Its velocity now reads 4011 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, GET 343300, CST 2055 111/1

PAO This is Apollo Control, Houston, at 34 hours, 33 minutes since liftoff. Apollo 12 is now 125 686 nautical miles away from earth. Velocity now reads 3982 feet per second. We've had discussions with the crew who asked about the type of film to be used in their window photography. Additionally, we passed up one of the contingency pads to them for storage in their computer and we will play those tapes for you now.

SC Houston, 12.

CAPCOM Go ahead, 12.

SC We've been having a little discussion here on this photograph in the windows. We had the exterior color, I presume, really what you wanted was the CEX- HCEX rather than the normal color.

CAPCOM Stand by a second, Pete, I will check on it.

SC We were showing where the color exterior at 368. We should have shot at a much slower speed so that prompted us to use 8 CEX and maybe you'd better clarify that.

CAPCOM Okay, they are checking right now.

SC Thank you.

CAPCOM 12, Houston. While we are looking for that answer for you, I've got an LOI minus 5 flyby pad - maneuver pad for you if you want to grab out a form.

SC Okay. We are ready to copy.

CAPCOM Roger, Pete. LOI minus 5 flyby, SPS G&N. 62633 NOUN 48 plus 090, minus 017, NOUN 33 078271661, NOUN 81 plus 00684 minus 02060, plus 05793, ROLL, PITCH and YAW is 052217338, NOUN 44 is NANA. DELTA VT is 06186, 126 06136, Sextant 321846 386, aboard sight is NANANA, NOUN 61 plus 00738 minus 16995 11659 36231 GETO 5 g's, 14552 20, GDC align stars are Sirius and Rigel. ROLL is 256 PITCH 152, YAW is 069. Ullage, none. Other burn is SPS docked. The LM weight is 33585. Over.

SC LOI minus 5, SPS G&N and I may have messed up on this one. 62633 plus 090, minus 017, plus 078, 271661, NOUN 81 plus 00684, minus 010060, plus 05793, ROLL, PITCH and YAW 052217228, NOUN 44 NANA. DELTA VT 06186 126 06136, 321846 386, NANANA, NOUN 61 plus 00738, minus 16995 11659 36231, 14552 20, the stars Sirius and Rigel, ROLL 256 152, 069, ullage none, SPS docked, LM weight is 33585.

CAPCOM That's affirmative.

PAO That was Commander Pete Conrad taking down the T-5 hour - -

CAPCOM 12, this is Houston. Your readback was correct.

SC Okay. Very good.

CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Roger. Pete guessed us right. The data we sent you was based on H CEXL. So that is what you ought to use.
SC Okay. Thank you.
CAPCOM 12, Houston. Can we put our headsets back on now?
SC Yes. That's Dick's music.
SC They're friends of yours.
CAPCOM Apollo 12, Houston. You might consider taking a stereo pair with that camera on the window.
SC Okay. We'll give it a try.
PAO This is Apollo Control, Houston. You heard the reference from Jerry Carr jokingly saying can we put our headsets back on. That was Pete Conrad responding that it's Dick's music. At 34 hours, 42 minutes of the flight, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, 21:18 PM,CST, GET 34:56:00 112/1

PAO This is Apollo Control, Houston, at 34 hours, 56 minutes now into the flight. Apollo 12 is presently at altitude of 126 547 nautical miles. Its velocity now reads 3953 feet per second. We'll switch now to conversations that we've had from the ground with Apollo 12.

S/C Houston. 12.

CAPCOM Go ahead, Pete.

S/C Does it look like we are going to have to reinitiate the purge or not on CSM.

CAP Pete, dumping the tunnel down to 1.6 eliminated the requirement for it.

S/C Okay. Very good.

CAPCOM Hey, Pete. If you are looking for something to do, we have a geology pop quiz for you.

S/C Oh, thanks a lot. Go ahead, give it to us.

S/C Houston. 12.

CAPCOM 12. Houston. Go.

S/C We think we have the S-IVB in site. We have had an object which is in the same place all the time and appears to be tumbling. We have had it ever since yesterday and it just seems to be tagging along with us, so I guess that is the S-IVB. It's usually out our center hatch window when our ROLL angle is about 35 right now, maybe that will give you a clue and somebody can figure out if that is what we are really looking at.

CAPCOM Roger, Pete.

PAO This is Apollo Control, Houston. That was Jerry Carr offering Pete Conrad and Al Bean a geology pop quiz if they wanted something to do and we literally could do that in Mission Control Center now. Astronaut/Geologist, Jack Schmidt has joined Jerry Carr in the Control Center and in fact was a source of inspiration for Jerry Carr's offering. You heard Dick Gordon, Command Module Pilot, who will not go to the lunar surface suggest that we give them the quiz. That was Pete Conrad who reported sighting an object out the window which he thought might be the third stage of the Saturn V launch vehicle. At 34 hours, 59 minutes now in the flight of Apollo 12, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/15/69 CST 21:51 GET 35:29 113/1

PAO This is Apollo Control Houston at 35 hours and 29 minutes since liftoff. We've had no voice contact or communications with the Apollo 12 crew since our last announcement. However, we currently show an altitude of 127 808 nautical miles for Apollo 12. Its velocity now reads 3910 feet per second. So at 35 hours 29 minutes, this is Apollo Control Houston, continuing to monitor.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/15/69, 22:28 PM, CST, GET 36:06:00 114/1

PAO This is Apollo Control, Houston, at 36 hours, 6 minutes now into the flight of Apollo 12. Since our last communication, we have not attempted to contact the crew nor have they called the Mission Control Center. Our present altitude, as shown on our displays, reads 129 204 nautical miles above the earth. Velocity now reading 3862 feet per second for Apollo 12. So at this time we continue with a very quiet phase of the mission and this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 36 hours, 36 minutes into the flight of Apollo 12. Apollo 12 is presently 30 289 nautical miles above the earth. It's velocity now reading 3825 feet per second. Capsule communicator Jerry Carr has been passing along to Apollo 12 some of the mission operations control room insights as to the tumbling object which the crew reported seeing earlier. We will play that conversation to you now.

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Roger, Pete. That thing you saw off the hatch, a ROLL of 35 degrees, we figured there's 3 possible answers. no. 1 it could be the S-IVB or possibly a sla panel or it could be the backup crew flying train on you. there. One is not anywhere near as bright as the other, so I think the real bright one is the S-IVB and the other one is probably a sla panel. They are about 20 degrees apart. As far as the backup crew goes, tell them we will beat them to the back side of the moon.

CAPCOM Roger, Pete. Best as we can tell down here now, best as we can tell down here now, the S-IVB should be near denebola and if it is a sla panel - correction what you are saying now ought to be near Enif, is that correct?

SC Yes. It's near Enif.

CAPCOM Roger, Pete. The words here are that the S-IVB is about 180 degrees away Denebola.

SC Okay. I wonder what that could be?

CAPCOM Okay. We'll go back to our drawing board.

SC The object is very bright and it is obviously something that is tumbling. It is tumbling one and one-half revs per second or at least it is slashing at us about that. Dick is going to tell you what star it is nearing. He is messing with his chart right now.

CAPCOM Roger. We are standing by.

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM As best as we can tell, looking at things down here - on those sla panels, we assume that they weren't imparted any great amount of DELTA V - like anything more than one or so feet per second when they separated. Your sla panels would probably be only about 300 miles away from you right now.

SC That could be true but, gee whiz, when we turned around, I saw one of those sla panels leaving the area at a high rate of speed and it looked to me like it

APOLLO 12 MISSION COMMENTARY 11/15/69, GET 36:36:00 CST 22:25 115/2

SC was leaving us pretty - at a pretty rapid clip, like it got a lot more than a foot per second or so.

CAPCOM Well, since we don't really have any idea how they left or what their trajectory could be, it's kind of tough really to say just what the heck that could be.

SC Okay. We'll assume it's friendly anyway, okay?

CAPCOM Roger. If it makes any noises, it's probably just wind in the rigging.

PAO This is Apollo Control, Houston. So we have no definite agreement as to what the crew may have sighted. Our best estimates place the S4B to be about 2500 nautical miles away from Apollo 12 at this time. The SLA panels that were not attached at the time of the S4B as sling shot maneuver. A smiling Dave Scott was in the control room when they remarked about the back up crew following was made. That was Dick Gordon from the spacecraft who makes the assumption that whatever they saw must be friendly. At 36 hours, 40 minutes into the flight, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/15/69, 23:48 CST, GET 37:26:00 116/1

PAO This is Apollo Control, Houston at 37 hours 26 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft is now 132,125 nautical miles away from earth. It's velocity now reads 3,763.7 feet per second. Since our last announcement, we have had no further contact with the Apollo 12 crew and a quiet studied atmosphere predominates in the Mission Control Center. Although you saw the midcourse correction burn performed on television earlier today, and knew that it was performed as advertised, we will pass along the official statistics from the flight dynamic officers log. The time of ignition for that burn was 30 hours 52 minutes and 43 seconds ground elapsed time. It's delta velocity was 61.8 feet per second and burn duration was 8.82 seconds. Although the requirement for additional midcourse corrections is considered very slight at this time the flight dynamic officer will continue to evaluate his vectors and the option will remain open at least for the time being, at 37 hours 28 minutes into the flight of Apollo 12, this Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69 CST 00:21 GET 37:59 117/1

PAO This is Apollo Control at 37 hours, 59 minutes. At the present time Apollo 12 is at an altitude of 133 311 nautical miles from the Earth traveling at a speed of 3724 feet per second. We've just had the first call from the spacecraft in some time, a brief conversation with Pete Conrad. We'll pick up the tape on that and then stand by to carry the rest live.

SC Houston, 12.

CAPCOM Hello, 12. Go.

CAPCOM Apollo 12, Houston. Apollo 12. Apollo 12, Houston. Go.

SC Roger. Houston, if you haven't got anything to do down there, how about telling us where - what longitude line the terminator of the moon is on.

CAPCOM Roger, 12. It's in work. You sure you don't want that geology pop quiz?

SC Al's all eager. He says give it to him.

SC Houston, Apollo 12.

CAPCOM 12. Houston. Go.

SC Roger. We're getting close enough to the moon now so that even with the monocular the moon looks a lot like these photographs that you see taken from many of the observatories that are around the center. We were looking at it through the sextant a minute ago and it really looks spectacular. It's starting to take on less of a silver color and more of a gray color - look at it up close.

CAPCOM Roger. Al, watch those color descriptions.

SC You said it.

CAPCOM Apollo 12, Houston. We're working on that question of yours. Also, it's about time now to terminate battery A charge. Over.

SC Okay, that's in work.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM That terminator longitude is between 7 and 8 degrees east. Over.

SC Roger. Thank you.

PAO This is Apollo Control. We're getting a bit of noisy communications here as the spacecraft rotates through one omni antenna and on to the next. The change of shift is presently going on in Mission Control. Flight director Clipper Charlesworth is coming on to replace flight director Pete Frank and his team of flight controllers. The capsule communicator on this shift will be astronaut Ed Gibson replacing astronaut Jerry Carr. At 38 hours 10 minutes into the flight of Apollo 12 the spacecraft is now 133 689 nautical miles from Earth traveling at a speed of some 3700 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69 CST 01:32 GET 39:10 118/1

PAO This is Apollo Control at 39 hours, 10 minutes. Apollo 12 presently at an altitude of 135 809 nautical miles from Earth traveling at a speed of 3642 feet per second. We've had no further conversations with the crew since our last report. Flight director Clifford Charlesworth went around the room and pulled each of his flight controllers for a status shortly after coming on shift. The spacecraft continues to function normally and no problems. The crew is scheduled to begin a 10 hour rest period at 43 hours into the mission or about 4 hours from now. The spacecraft is continuing to maintain a stable passive thermal control attitude rotating at a rate of about 3 revolutions per hour. At 39 hours 11 minutes this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 40 hours 2 minutes. Apollo 12 now traveling at a speed of 3585 feet per second and 137 600 nautical miles from Earth. We're in conversation with the spacecraft at this time. We also have a small amount of tape accumulated since our previous talk with the crew. We'll play back the tape and then catch up with the live conversation.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Well, troops, it looks like a good burn today. Good show. Say, Pete, we got some folks sitting next to us here who would like to get some biomed data on the three of you tonight. Why don't you kick around and give us a reply.

SC What do you want us to do? Keep our biomed hooked up tonight?

CAPCOM That's affirm.

SC Okay, you want it on all three?

CAPCOM That's correct. One thing they would like to do is get a baseline to help them during the EVA. They'd like to get - apparently they use some of that data for input to the equations which they'll be using during the EVA.

SC Sleep stuff?

CAPCOM That's what we're told.

SC Okay, we'll leave it hooked up unless it bothers us.

CAPCOM Okay.

SC I'm not exactly sure how you get inside the sleeping bag.

CAPCOM Okay, that sounds good. Thank you.

SC Hello, Houston, Apollo 12.

CAPCOM Apollo 12, Houston. Go ahead.

CAPCOM Hello, 12, Houston.

SC Hello, Houston, Apollo 12.

CAPCOM 12, Houston. Go ahead.

CAPCOM Hello, 12, Houston. Go ahead.

SC Roger. The LM/CSM Delta-P is plus 1.7.

CAPCOM Copy. 1.7.

SC And we'll be bringing the purge line heaters on at 4 to 0 plus 35 by the flight plan.

CAPCOM Roger, Pete.

SC And what do you want us to dump the waste water to? 25 percent or 15 percent?

CAPCOM Let's take it down to 10 percent this time. That'll give you a pretty good margin.

SC Roger. 10 percent.

CAPCOM You folks have been pretty quiet. What's up?

SC Nothing. We're just exercising and listening to the tape recorder and looking at the moon and looking at

SC the Earth or reading the books.

CAPCOM Roger. How's that tape recorder? Is the RPM up to nominal?

SC Yes, it works pretty good here in zero g. It works better than it does down there on the ground. It just doesn't have much in the way of volume up here with a 5 psi.

CAPCOM How's that cloud cover over the Pacific at this time?

SC Australia is real clear again and it doesn't look quite as cloudy north of Australia. It's sort of a, it's got a rectangular shaped whatever the system is north of Australia there. It's kind of funny looking.

CAPCOM Roger. What's the smallest piece of land you can pick out.? Can you see any of the Pacific islands?

SC No, we haven't - we can't see any of them. Dick just says he can see Bordeaux right now. He's looking through the monocular. You can't see it with the naked eye though. I think one of the problems is that the only thing that we could see would be close to the curve. All the terminator - we're not looking at that much of an earth and all (garble) water.

CAPCOM Roger. We're just (garble)

SC (Garbled)

CAPCOM 140 000. Stand by. We'll give you a little more accurate.

SC Okay.

CAPCOM Pete, you're now 137 720 out and you're going along at 3580 feet per second.

SC Roger.

SC Okay, we're going to ask the DSKY and see what it thinks. Not bad. 137 750.

CAPCOM Roger. We're showing 755 right now.

SC It'll only read to the nearest tenth and the velocity is 3579.

CAPCOM 12, Houston. We have some unofficial results from the elections today. It looks as though Mayor Louie Welch was reelected to a fourth term. His closest competitor, Curtis Graves, got a 59 000 and the mayor's up to 98 now. Let's see, first time since, I believe, of 1927 we got a fourth term for a mayor.

SC Very good.

CAPCOM Say, Al, is that moon beginning to look a little bigger to you now?

SC It sure is. We were watching it through the sextant while ago and the features on the moon are much more pronounced than they are - than we've seen before we left Earth. They looked almost like weatherly stripped pictures you've seen from an Earth-space telescope. The terminator is about 7 or 8 degrees east and it's right on the edge of a mare and running through some of the terra. It's very stark

APOLLO 12 MISSION COMMENTARY 11/16/69 CST 02:24 GET 40:02 119/3

SC and beautiful from this point of view. I imagine tomorrow it's going to be even more impressive.

CAPCOM Probably be very impressive from a distance of around 3 or 4 feet.

SC That too.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69 CST 02:35 GET 40:13 120/1

PAO This is Apollo Control. We're now about 3-1/2 hours from the scheduled beginning of the crew sleep period. It continues to be quite quiet, both from the spacecraft and from here in Mission Control. The crew scheduled to begin a eat period at about 41 hours, 30 minutes, about an hour from now. Spacecraft presently traveling at a speed of 3561 feet per second, has reached an altitude of 138 330 nautical miles from Earth. At 40 hours, 23 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, 03:20 CST, 40:58:00 GET 121/1

PAO This is Apollo Control at 40 hours 58 minutes into the flight of Apollo 12. The spacecraft now traveling at speed of 3523 feet per second and an altitude up to 139 509 nautical miles. Continues to be very quiet here this morning. We have had one brief conversation with the crew since our last report requesting that they hold off on the scheduled waste water dump until about 41:20:00 at which time will be any more favorable position from standpoint of the passive thermal control, and have the minimum impact on the passive thermal control. We'll play back that short bit of conversation and then stand by for any live communications.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM 12, if you hold off on the waste water dump and the fuel cell purge until 41:20:00 you'll minimize the effect on PTC.

SC Sounds like a good suggestion. We'll do that.

CAPCOM Roger.

END OF TAPE

PAO This is Apollo Control at 41 hours, 50 minutes. Apollo 12 now traveling at a speed of 3467 feet per second up to an altitude of 41 270 nautical miles. The crew advised us a short while ago that they were performing the waste water dump and fuel cell purge as listed on the Flight Plan. A little while after that Dick Gordon reported that apparently the energy imparted by dumping the waste water had affected the passive thermal control attitude apparently setting up some sort of a mild raid in the slow rotational rate that we have. We're watching that in Mission Control now to see if it's going to be necessary for the crew to damp out the movements about the spacecraft axes and reestablish the passive thermal control before they go to sleep. We'll play back the tape for you on those conversations and then continue to standby for a short while.

SC Okay, Houston. Apollo 12 is dumping waste water and purging fuel cells.

CAPCOM Roger, 12. Pete, can you see any ice crystals from there?

SC You can see the water dumps, there's no doubt about that. There's all kinds of it. In fact, they look like regular snow storms.

CAPCOM Does the snow storm tend to hang around or does it move off pretty quickly?

SC It moves on pretty fast. Hello, Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC Hey roger, Ed. I don't think that water dump did the PTC any good at all.

CAPCOM G and C concurs with that down here. Dick, let us watch it a little while. We haven't seen you much travel since you made that dump. You're around 25 degrees out now. We'll be keeping an eye on it to see which way you're going. Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM In looking at your angles here it looks as though you might be pretty touch and go during the sleep period if you don't go ahead and reinitialize the PTC and when you do that give us a little better propellant margins. We'd like you to go ahead and reinitialize the DAP to .2 degrees per second rather than the .5 you have in there now.

SC Got you.

PAO This is Apollo Control. As you heard, CAPCOM Ed Gibson advised the crew to reestablish the passive thermal control mode. This is primarily because of the wabbling motions imparted to the rotational rate of the spacecraft by the water dump. It's felt that if the wobble is allowed to continue during the sleep period it could conceivably grow to the point during the night where

PAO it would be necessary to awaken the crew to damp out this wobbling movement rather than take that chance and perhaps have to awaken the crew during the night we've elected to go ahead and reestablish the passive thermal control mode after stabilizing the spacecraft and the roll rate in the new passive thermal control mode will be about 2 revolutions per hour. The purpose of this, of course, is to maintain the proper temperature balances within the spacecraft as the vehicle rotates putting first one side and then the other toward the sunlight. Apollo 12 now 34 out of 141 562 nautical miles from Earth and traveling at a speed of 3457 feet per second. At 41 hours, 59 minutes, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, 42 hours 29 minutes, Apollo 12 now 142,546 nautical miles from earth. 3,426 feet per second. The crew is presently going through their presleep check list, getting the spacecraft prepared for the sleep period. They are scheduled to begin an eat period at about this time and then begin their rest cycle a 10 hour rest period at 43 hours or about 30 minutes from now. We have had a couple of brief conversations with the crew since our last report. Pete Conrade advised a short while ago that they were going to dump the erasable memory for a routine check. The presleep check list also (garble) plus chlorinating the onboard drinking water and setting a number of switches in the proper positions prior to beginning the sleep period. We'll play back the tapes for you and then continue to standby briefly.

CAPCOM Apollo 12, Houston. We've got a state vector for you, if you will give us the check.

CAPCOM 12, Houston. The state vector is in and we are ready for the E MOD whenever you want, no hurry.

CAPCOM 12, Houston.

S/C Go ahead.

CAPCOM State vector is in, computer is yours. We are also ready to pick up on the roll now, Dick and we are ready for the E MOD DUMP, no hurry on that. Also we have a question. Have you cycled the water quantity indicator switch, recently?

S/C Yea, which one do you want it in?

CAPCOM Your position - I guess you haven't waste right now, it's fine, no problem either way, we just wanted to know whether you cycled it, because we saw a funny down here.

S/C Well it is in potable right now, do you want it in waste?

CAPCOM Affirmative, Pete. Waste is good.

S/C What was the funny? Okay with the waste, then what was the funny?

CAPCOM Pete, we saw the water quantity go from 101 per cent down to 72 per cent and remain there for a period of time and then work its way on back up to 101 per cent and if you had cycled that switch, that would do it. That is the reason for the question.

S/C Okay, I don't really remember, but we may have cycled it a couple of times.

CAPCOM Okay.

S/C Houston, 12.

CAPCOM 12, Houston. Go ahead.

S/C New MEMORY DUMP coming at you.

CAPCOM Roger, we are standing by.

CAPCOM 12, Houston. We have the E MOD.

S/C 12, Roger.

APOLLO 12, MISSION COMMENTARY, 11/16/69, 0451 CST, GET 42:29:00, 123/2

PAO This is Apollo Control, it appears we will have no further conversation, at least for the time being. I probably will hear from the crew at least once more before they begin their sleep period. Probably within about 30 minutes. The spacecraft continues to function normally, all systems normal. We are now 142,814 nautical miles from earth, traveling at a speed of 3,417 feet per second. At 42 hours and 37 minutes, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control at 43 hours, 4 minutes. The crew just called in and reported that they have completed the pre-sleep check list, and will be beginning their sleep period shortly. We'll pick up the tapes of that conversation for you and then stand by for live conversations.

CAPCOM 12, Houston. Go ahead.

SC Thank you. Let me give you the onboard readouts. Bat Charlie, 37.0. Pyro bat A, 37.0. Pyro bat B, 37.1. We have no RCS quantities. The indicator is on BA. Presently the check list is complete and we will be going to our comp configurations for sleep period in just a minute. And we're still doing some housekeeping chores, so you'll see some BIOMED on and off, a little bit while we get ready to go to bed.

CAPCOM Roger, Pete. We copy. 37, 37, 37.1. And we have the RCS consumables if you are interested.

SC Okay. Ready to copy.

CAPCOM RCS total 80.9. 878.9. 83.1. 79.2. 32.8. And that't at 40 hours, even.

SC Roger.

CAPCOM And we are assuming a negative crew status report.

SC That's right. (garble)

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Before you go on off to sleep, would you take the - clear the DSKY and do with it with a VERB 45 or VERB 66 rather than 37?

SC Roger.

SC Is there any reason why we can't leave the clock time up there?

CAPCOM Yes. We just prefer all those not as strong a desire to throw the DSKY so you're not working the relays in the DSKY to give you a little longer life.

SC Okay.

CAPCOM And 12, your PTC is looking good. We expect less than 6 degrees excursion during the sleep.

SC Okay.

CAPCOM And 12, we'll be talking to you tomorrow. So long.

SC That's good night.

PAO The crew sleep period is scheduled to last some 10 hours, beginning at about 43 hours as scheduled in the flight plan. Apollo 12 is presently 143 833 nautical miles from the Earth. The spacecraft velocity down now to 3 386 feet per second. At 43 hours, 9 minutes into the flight, this is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, 06:00 CST, 43:38:00 GET 125/1

PAO This is Apollo Control at 43 hours 38 minutes. We have not heard from the crew since Conrad announced about 30 minutes ago that they were going to be in their 10-hour rest period. The spacecraft velocity now is 3355 feet per second and altitude 144 801 nautical miles. The guidance and control officer reported a short while ago that the spacecraft is maintaining good stable passive thermal control attitude rotating at the rate of about 2 revolutions per hour to maintain the proper temperature control during the time the crew are asleep. This sleep period is scheduled to end at about 3:30 this afternoon. At 43 hours 39 minutes this is Apollo Control, Houston.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/16/69, 0640 CST, GET 44:18:00 126/1

PAO This is Apollo Control at 44 hours 18 minutes, Apollo 12 presently 146,029 nautical miles from earth. Spacecraft velocity continuing to drop off slowly, now down to 3,317 feet per second. The flight surgeon reported that the crew appears to be settling down and getting to sleep at this time. They are about 1 hour into their scheduled 10 hour rest period. All spacecraft systems continue to function normally at this time. At 44 hours 19 minutes, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69 CST 0740 GET 45:18 127/1

PAO This is Apollo Control at 45 hours 18 minutes. It's been a little over 2 hours now since Pete Conrad advised that the crew would be beginning their 10 hours sleep period. The flight surgeon reported about an hour ago that the 2 crewmen on whom we have biological data, Conrad and Bean, appeared to be getting to sleep at that time. Apollo 12 is now traveling at a speed of 3257 feet per second and the altitude continuing to increase gradually, 147 977 nautical miles from earth. All spacecraft systems are functioning normally at this time. It's been a very quiet night. We do not expect to hear from the crew until about 3:30 this afternoon central standard time. At 45 hours 19 minutes, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 461800 CST 0840 128/1

PAO This is Apollo Control at 46 hours, 18 minutes. The Apollo 12 crew is asleep. There is 6 hours, 41 minutes remaining in this rest period. Apollo 12 is 149 827 nautical miles from earth; velocity is 3 200 feet per second. System performance continues to be normal. This is Mission Control Houston at 46 hours, 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 471800, CST 0940 129/1

PAO This is Apollo Control at 47 hours 18 minutes. Systems performance continues normal, Apollo 12, as the crew continues in its sleep period. Five hours 41 minutes remaining in that rest period. Apollo 12 is now 151 654 nautical miles from earth traveling at a velocity of 3144 feet per second. This is Mission Control Houston at 47 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 481800 CST 1040 130/1

PAO This is Apollo Control at 48 hours, 18 minutes into the mission. Apollo 12 is 153 414 nautical miles from earth, traveling at a velocity of 3 091 feet per second. All spacecraft systems continue normal, and 4 hours 41 minutes remaining in the crew's sleep period. This is Mission Control Houston at 48 hours, 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 491800 CST 1140 131/1

PAO This is Apollo Control at 49 hours 18 minutes. Apollo 12 is 155 198 nautical miles from Earth. Its velocity 3 037 feet per second. Three hours and 41 minutes remain in the sleep period for the Apollo 12 crew. All systems continuing to operate normally. We are showing a total weight in space of 96 218 pounds. This is Mission Control, Houston, at 49 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 501800 CST 1240 132/1

PAO This is Apollo Control at 50 hours 18 minutes. Apollo 12 is 156 922 nautical miles from Earth. Velocity 2 986 feet per second. Two hours and 41 minutes remaining in Apollo 12 crew's sleep period. Flight Dynamics Officer reports after studying all the tracking information that Midcourse Correction Number 3 will not be required. To repeat, we do not intend to perform Midcourse Correction Number 3. This is Mission Control, Houston, at 50 hours 18 minutes into the Mission of Apollo 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69 13:40CST GET 51:18:00 133/1

PAO This is Apollo Control at 51 hours 18 minutes. One hour 41 minutes remaining in Apollo 12 crew's sleep period. Apollo 12 Spacecraft is 158 627 nautical miles from Earth. Velocity is 2 935 feet per second. This is Mission Control, Houston at 51 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, 14:40 CDT, GET 52:18:00 134/1

PAO This is Apollo Control at 52 hours, 80 minutes. We're 41 minutes away from crew wake up time. Apollo 12 is 160 294 nautical miles from earth, velocity 2 886 feet per second. All systems performance still normal. This is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69. CST 1518, GET 52:56 135/1

PAO This is Apollo Control at 52 hours 56 minutes. CAPCOM Paul Weitz is getting ready to put in a call to the crew now.

CAPCOM Reveille being played.

SC Good morning, good morning.

CAPCOM Good morning, Pete.

SC We're just getting stirring up here and we'll be with you in a few minutes.

CAPCOM Okay.

PAO Apollo 12 is 161 436 nautical miles from the earth; velocity 2852 feet per second. We'll continue to stand by for air to ground conversation after the crew gets a little bit organized.

SC Houston, 12. We're ready for the consumables update.

CAPCOM Okay 12. Your consumables update for GET of 53 hours. RCS total is 80.2. For information Pete, that puts you 95. That's 95 pounds below the how goes it. Reading ALPHAs thru DELTAs 77.5 82.4 78.5 82.5. Your hydrogen is at 80.6/78.8. Oxygen is 81.0/80.7. Over.

SC Copy.

CAPCOM 12, Houston. No update to the flight plan this morning.

SC Okay.

SC Ed, Houston. On the crew status report, the CDR slept approximately 8 hours, CMP approximately 9, the LMP approximately 8. PRD readings for the CDR, 11010, CMP 11009, LMP 04010.

CAPCOM Roger 12. Copy.

CAPCOM Reveille being played.

SC Everybodys at attention here.

CAPCOM 12, Houston. Let me know when you're settled in the breakfast nook and I'll give you the morning news.

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

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 53:08:10, CST 1530, 136/1

PAO The Cap Com is Astronaut Paul Weitz.

SC Hello, Houston. 12. We're ready for the news now.

CAPCOM Okay, 12. The news reports on the flight of Apollo 12 are highlighting yesterday's mid-course direction, and the fact that the flight is moving along smoothly. One lighter service story calls attention to the improvement in the food menu on this flight. Local, as well as net-work stations, played video tape highlights of your television show yesterday. Prayers for the flight's success were said in churches everywhere. In Houston, Mayor Louie Welch won his fourth consecutive term by defeating 5 candidates. He won 53 per cent of the vote. His nearest opponent was Curtis Graves who received about 31 per cent of the vote. A minimum housing code and a freedom of choice integration plan won a strong support. That's about it for news. A recap of how the top ten teams did yesterday. Ohio State beat Purdue 42 to 14, Texas beat TCU 69 to 7. I guess they're trying to edge Ohio State in the ratings. Tennessee lost to Mississippi final score on that one was 38 to nothing. Arkansas beat SMU 28 to 15, Penn State over Maryland 48 to nothing, Southern Cal edged Washington 16 to 7, UCLA over Oregon 13 to 10, Missouri beat Iowa State 40 to 13, Notre Dame won over Georgia Tech, last night 38 to 20, and of course, Purdue lost to Ohio State. Some pro scores from today are in. These are finals. Dallas beat Washington 41 to 28, Detroit over St. Louis 20 to nothing, the Minnesota Vikings squeaked by Green Bay 9 to 7, and Kansas City, in the American League beat New York 34 to 16. We'll keep you posted on them as they come in later.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 532310, CST 1545 137/1

CAPCOM Hello 12, Houston, we'll be handing over from Madrid to Goldstone in two minutes. You may get a momentary loss of signal.

SC Okay.

SC Roger.

PAO This is Apollo Control at 53 hours, 31 minutes. Apollo 12's distance is now 162 315 nautical miles velocity 2826 feet per second. The change of shift news conference in the MSC news center will be at 4:30 Central Standard Time, 4:30 p.m. for the change of shift news conference.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, 16:00 PM, CST, GET 53:38:10 138/1

PAO This is Apollo Control at 53 hours, 43 minutes. This is a quiet period as the crew is having breakfast. We are in the midst of a shift changeover here in the Control Room. We will take this release line down now and come back up when there is further conversation. This is Mission Control, Houston, at 53, 43 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69, CST 1619, GET 53:57 139/1

PAO This is Apollo Control Houston. At 53 hours 57 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft, at this time, 162 988 nautical miles in altitude. Its velocity now reads 2807 feet per second. In Mission Control Center we've just had a turnover in Flight Controller teams. Pete Frank and members of his orange team are now aboard replacing the Jerry Griffin team. Our Capsule Communicator for this shift will be Don Lind who has just taken over the console from Paul Weitz. As was reported earlier, the Midcourse Correction No. 3 burn will not be done. And the crew, the Apollo 12 crew, presumably at this time, is having breakfast. They were awakened approximately an hour ago with the call of reville. The Change of Shift News Conference is scheduled to begin as previously announced at 4:30 and will include Flight Director Jerry Griffin and the Public Affairs Officer, Jack Riley. At 53 hours 58 minutes into the flight, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo control, Houston at 54 hours 22 minutes now into the flight of Apollo 12. The spacecraft presently 163 645 nautical miles in altitude. Now travelling at 2787 feet per second. We've accumulated some tape communications with Apollo 12 during the news conference. During these transmissions, Commander Pete Conrad expressed a curiosity common to most newsmen covering Apollo 12. He wanted to know how far out they were and how fast Apollo 12 was going. We'll play those tapes for you now.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Pete, we've looked at the situation here.

We don't think that a mid-course number 3 is going to be required. We're still evaluating number 4. It'll be small if we need it at all, so there will be no mid-course number 3. Also, we'd like you to balance the hydrogen for the fuel cells by turning tank number 2 heater OFF, and until we get those back in balance. Also, for your information, the Phoenix racers were rained out after 53 laps yesterday, and so they're going to be rerun today, and we'll let you know the outcome.

SC Okay, very good. Hydrogen tank 2 heater is OFF.

CAPCOM Roger. How's breakfast this morning?

SC It's in work right now. Very good.

CAPCOM Fine.

SC Houston, 12.

CAPCOM Go. 12, this is Houston. Go ahead, please.

SC Houston, Apollo 12.

CAPCOM Apollo 12, Houston. Go.

SC Roger. Two questions. One, how far out are we, and two, what time do we reach the lunar sphere influence?

CAPCOM Roger. I'll get those numbers for you, Pete. You might want to turn your uplink squelch OFF. We're kind of low on signal strength here. You may not hear us very well. I've called you several times. So that may be a cure.

SC Yes, I think we were just in the process of switching antennas or something.

CAPCOM Okay. Pete, the time for your crossing the lunar sphere of influence is 68 plus 30 plus 19. Your altitude above the Earth is 16 3000 280. Your altitude above the Moon is 6 3000 190.

SC Okay, and how fast are we going now?

CAPCOM 2797. Now that's in reference to us down here.

SC Understand. Go ahead.

CAPCOM Pete, a question. We wanted to know whether you wanted to manage the antennas or whether you wanted us

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 54:22:00, CST 16:43, 140/2

CAPCOM - to continue back and forth.

SC We've gone to high gain now. We'd like you to switch back and forth.

CAPCOM Okay, if - if a - you're going to leave control of that down on the ground, they would prefer to stay in OMNI only, and turn off the high gain.

SC Okay. We'll go back to OMNI.

CAPCOM Thanks very much.

PAO This is Apollo control, Houston. That time passed to Apollo 12 - that time for crossing the lunar sphere of influence was ground elapsed time of 68 hours 30 minutes 19 seconds. You just heard Commander Pete Conrad talking back and forth with the capsule communicator in Mission Control Don Lind. At 54 hours 27 minutes now into the flight, this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 54 hours 47 minutes now into the flight. Apollo 12 now 164 328 nautical miles above earth. Its velocity now reads on our digital displays 2767 feet per second. We've just passed up to Commander Pete Conrad the Phoenix 200 unofficial but final race results and had additional conversation with both Conrad and Dick Gordon. We'll play those conversations for you now.

SC Houston, 12.

CAPCOM Houston, GO.

CAPCOM Apollo 12, this is Houston, go ahead.

CAPCOM Apollo 12, Houston.

SC Houston, Apollo 12.

CAPCOM 12, go ahead.

SC Roger. We changed out the LIOH canister and the map CM DELTA P is 1.82.

CAPCOM 1.8 what.

SC 2

CAPCOM Roger, thank you. It seems like everytime you call, you catch us with an uplink signal down. Lithium hydroxide is changed and 182 for the DELTA P.

SC You're breaking up. I think we are changing antennas. Say again.

CAPCOM Roger. Confirm - not sure - lithium hydroxide change out and DELTA P at 1.82.

SC Roger.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM For your information the Phoenix 200 is over. We still have only unofficial results. The unofficial results show Al Unser as the winner, No. 2 is Ruby and No. 3 is Don Allenbach.

SC Roger. Thank you very much.

CAPCOM Roger.

SC Hello, Houston, 12.

CAPCOM Houston, go ahead.

SC Okay, Don. Everybody has had breakfast, brushed their teeth, combed their hair and we are thinking about shaving today for you, but a big question I've got. I want to do that P52 opposite 3, the one that the flight plan has optional in 55 hours or so. And, I want to remain in TPC while I do it. You concur.

CAPCOM We concur. Fine. It sounds like you are ready for another busy day.

SC It really doesn't look that way, really. I think we will just practice for awhile.

CAPCOM You're all cleaned up and nowhere to go.

SC We're going somewhere; we're not sure where.

CAPCOM We are.

SC It doesn't look like we are going very far for 2 days now.

CAPCOM You'll be a long way home. You've been traveling a long way.

PAO This is Apollo Control, Houston. That was Dick Gordon making the report that they had completed breakfast, brushed their teeth and combed their hair and might even shave. The P52 reference is a platform alignment and command module pilot Gordon did indicate he would like to do it around 55 hours ground elapsed time. We are at 54 hours, 52 minutes now ground elapsed time and this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 55 hours, 14 minutes, now in the flight of Apollo 12. We presently show Apollo 12 at 165 029 nautical miles above the earth. Its velocity now reads 2747 feet per second. Now we pick up conversation with Apollo 12 while the computer alignment program is in process. We'll switch now to that conversation.

S/C Houston. Apollo 12. Your're looking at the DSKY?

CAPCOM That's affirmative.

S/C Okay, Houston. You (garble)

CAPCOM Roger. We are watching your DSKY.

S/C Houston, do you have the torquing angle?

CAPCOM That is affirmative.

S/C Okay, we are going to go ahead and torque.

CAPCOM Roger.

PAO That was Commander Pete Conrad talking with Don Lind and at 55 hours, 16 minutes into the flight, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 55:43:00, CST 18:05, 143/1

PAO This is Apollo control, Houston, at 55 hours 43 minutes now into the flight of Apollo 12. We currently show an altitude for the spacecraft of 165 802 nautical miles. Velocity now reads 2725 feet per second. We'll pick up a conversation now in which lunar module pilot Al Bean is describing his view of the Earth while looking through binoculars.

SC Houston, Apollo 12.

CAPCOM Houston, go.

SC Roger. Just looking through the monocular again at the Earth, and looks like it's dark everywhere except the lower left hand corner of California. Right in there L.A. and San Diego and I can't see Baja, California. It may be just twilight there. It's kind of hazy - not hazy, but in the dark light relationship, it's kind of difficult to tell. The lower left corner of California is the only part we can see in the sunshine right now.

CAPCOM Roger. What does the weather look like out there?

SC Looks beautiful. See it real well. It doesn't appear to be any clouds - any large cloud formations near it. There's a nice crescent shaped large weather system that appears to be several hundred miles out to sea, but I don't know if that will affect it or not. The whole area around that southern tip of California there is nice and fair.

CAPCOM Very good.

PAO At 55 hours 46 minutes now into the flight, this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 56 hours 15 minutes now into the mission. Apollo 12 is presently shown at 166 616 nautical miles above the earth. It's presently traveling at a speed of 2701 feet per second. We'll pick up additional conversation with Al Bean in which he further describes views of the earth and following that capsule communicator Don Lind will give Dick Gordon an update on the professional football scores for today. We'll pick up those conversations now.

SC Houston, Apollo 12.

CAPCOM Go ahead.

SC Been looking at the earth aboard through the monoculars and I think maybe the part of the U.S. that I thought was the lower left-hand corner, the Los Angeles area, it was just about to have sunset was really not. I don't think I could see that because of the - it's color related to the blue of the rest of the earth. Maybe it was the desert area around Phoenix and around in there. Just thinking about it. I am not able to discern at all the lower left-hand corner of the U.S., I think, because of the colors.

SC Roger. A little smog out there in L.A ?
Can't see through it?

SC No, I don't think it's smog. I can't see any of that area. It's probably just that the earth out there has more trees, shrubs and the like and that makes it quite a bit grey-green which is sort of like the ocean when you look at it from this view and they just blend in together. You're not able to tell exactly where one starts and one ends. We noticed that a little bit as were closer to earth and now as we get out this far about all we can see is (static).

CAPCOM Apollo 12, Houston.

SC Houston, Apollo 12.

CAPCOM Roger. We were switching antennas there and lost the last part of that transmission. Sounds like you got a good view out there tonight.

SC Not too bad. Hey, Don, how did the Oilers and the Saints make out today?

CAPCOM The Oilers tied on the last play of the game. 20 - 20 was the final score.

SC What was the score?

CAPCOM 20 - 20.

SC 20 - 20, huh? How did the Saints do?

CAPCOM 25 to 24 for New Orleans.

SC Roger. Thank you.

CAPCOM Yes. Say, listen, can you see any of that antenna from your position in the daylight?

SC That's affirmative, Don. We can see a large portion of it as a matter of fact. It's continually in sunlight.

CAPCOM Roger. I've got some other scores for you, if you are interested.

SC Go ahead.

CAPCOM AFL- Houston, Denver 20 - 20; Kansas City over New York 34 - 16; Boston over Cincinnati 25 - 14; Buffalo over Miami 28 to 3; Oakland took San Diego 21 to 16; International- as I said New Orleans over New York 25 - 24; Chicago 31, Atlanta 48; Philadelphia 17, L. A. 23; Detroit took St. Louis 20 to 0; Dallas 41, Washington 28; and L.A. over Philadelphia 23 to 17.

SC Roger. Thank you very much.

SC And could you give us the exact longitude the terminator is on the bird at this time?

CAPCOM Wait a minute. We'll get it for you.

PAO This is Apollo Control, Houston. That was capsule communicator Don Lind giving the football scoreboard report. We are at 56 hours 22 minutes now into the flight and this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, Houston, at 56 hours, 41 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft at this time 167 298 nautical miles away, its velocity now reading 2682 feet per second. Don Lind has just had conversation with Apollo 12 concerning our upcoming television show now scheduled or now set for 1:52 AM tomorrow morning.

CAPCOM Apollo 12, Houston.

S/C Go ahead.

CAPCOM The terminator on the moon now is 1 degree west, we are going to try to get it more accurately for you than that, but 1 degree west is the present terminator.

S/C Okay, thank you.

S/C Houston, Apollo 12.

CAPCOM Go 12.

S/C We were just talking about the TV show this afternoon and I guess what we would like to do - probably hasn't been seen before that I remember, if we could get high gain antenna angle in the sun and center hatch so we could get as much light as possible into the command module, we would like to use the TV and try and show the removal of the hatch probe and drogue and then take the TV over into the LM.

CAPCOM Very good. We'll get those angles for you. Sounds like a good show.

CAPCOM Apollo 12, Houston.

S/C Go ahead.

CAPCOM Just a note for the director of your TV presentation - we'll get the first 29 minutes of that presentation live; the rest of it will be recorded at Honeysuckle and shipped back to us - we'll get it in several days but we only get directly through Goldstone your first 29 minutes.

S/C Okay, we'll move it up and make sure we get to the LM by then, anyway.

CAPCOM Okay. Just wanted to make sure you got all your best performance in the first period.

S/C We're going to figure out something, Don.

CAPCOM Very good.

PAO This is Apollo Control, Houston. That was Pete Conrad who first brought up the subject of television. As you heard that final comment from Dick Gordon, we could move up the time of lunar module transfer - the transfer of the crew to the lunar module to coincide with the scheduled television time. We are now at 56 hours, 44 minutes into the flight and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, CST 1932, GET 57:10 146/1

PAO This is Apollo Control Houston at 57 hours 10 minutes now into the flight of Apollo 12. We've had no conversation with Apollo 12 since our last report. However, we thought we would pass along altitude and velocity updates at this time. Apollo 12 is presently shown at an altitude of 60 - -, 168 023 nautical miles; its velocity now shown at 2660 feet per second. This is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, CST 9:57, 147/1

PAO This is Apollo control, Houston at 57 hours 35 minutes now into the flight of Apollo 12. We currently show Apollo 12 at 168 650 nautical miles above the Earth. It's velocity now reading 2642 feet per second. Capsule communicator, Don Lind has just chatted with Al Bean on the subject of a tuna fish spread. We'll tune in on that now.

SC Hello, Houston. Apollo 12.

CAPCOM Go ahead, 12.

SC I've been asking the food experts down there we had a can of tuna fish spread soured last night, and there's about half a can left today, and that stuff's still good to eat, isn't it?

CAPCOM We'll check. Be right back with you.

SC Thank you.

CAPCOM 12?

SC Go ahead.

CAPCOM The surgeon suggests that you try a new one.

A new can.

SC Well, Dick has this one in his hot hand and we just opened it last night. Are you sure that one isn't all right?

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM We're still checking with the people down here whether there's any problem over that tuna fish, but why don't you hold off eating it until we get a better answer for you.

SC Okay.

PAO This is Apollo control, Houston. At least for now, the consumption of tuna fish spread one-day opened remains an open item. We'll keep you posted on developments. At 57 hours 37 minutes into the flight, this is Apollo control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, CST 2006, GET 57:44 148/1

PAO This is Apollo Control Houston at 1 - at 57 hours 44 minutes into the flight of Apollo 12. Apollo 12's altitude now reads 168 882 nautical miles. Its velocity now 2635 feet per second. We've closed the "tuna fish question". We'll switch now to Don Bean's er - Don Lind's conversation with the spacecraft.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM You can't imagine what consternation your tuna fish question has raised down here. We have a wide diversities of -

SC I decided it was okay.

CAPCOM Well, we have a vote that it's okay. The majority says throw it away; there's a minority report that says everybody can eat it except Dick Gordon.

SC Okay. That's done.

CAPCOM Roger. They recommend that you probably throw it away.

SC Okay.

PAO At 57 hours 45 minutes of the flight, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11-16-69, GET 582300, CST 2045 149/1

PAO This is Apollo Control, Houston, at 58 hours 23 minutes now into the flight of Apollo 12. We've had no conversation with the Apollo 12 crew since our last report. Presently we show an altitude of 169 851 nautical miles for Apollo 12. Its velocity now reads 2607 feet per second. WE're at 58 hours 23 minutes and this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo control, Houston, at 58 hours 35 minutes now into the flight. We presently show Apollo 12 at an altitude of 170 159 nautical miles. Its velocity now 2599 feet per second. We have just received a report from Commander Pete Conrad speaking for the all Navy Apollo 12 crew describing what they've been doing today. We'll switch to that report.

SC Hello, Houston. Apollo 12.

CAPCOM All right, Apollo 12. Go ahead.

SC Roger. Do you have a report on the families activities today?

CAPCOM Negative. We'll see if we can find out what's been going on over here.

SC Thank you. Meanwhile, Houston, I can tell you what we've been doing since we got up this morning, for your information. I cleaned the spacecraft fore and aft and all lower decks and ladders. Cleaned up the garbage, and restowed everything, and everybody had a bath and everybody shaved. And Al is studying the Moon. I'm studying descent, and Dick's been setting the SO I58 making sure it fits and works, and that's occupied us for about the last 3 hours.

CAPCOM Very good. Where do you put the garbage when you haven't got a fantail to throw it over?

SC We defined the area below the windowshade box and down next to the O2 mast as the fantail and we have rigged a garbage bag down there, and we retransferred all of the gear out of the TSD's, and neatly wrapped and packaged it and made sure they all had their pills and good things. (garbled).

CAPCOM Very good. You sound incredibly neat.

SC Haven't got much else to do, pal.

CAPCOM We'll get the reports on your families -

SC Also -

CAPCOM Go ahead.

SC Okay, also as we are approaching the Moon of course, we're beginning to notice less and less of the Moon. We're moving out in front of it, and although the terminator is coming around, we're beginning to see less and less of the illuminated portion of the Moon and it's becoming quite noticeable to us now.

CAPCOM Roger.

PAO That was capsule communicator, Don Lind speaking with Pete Conrad aboard the Apollo 12 spacecraft. We're at 58 hours 38 minutes now into the flight, and this is Apollo control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 59 hours, 3 minutes into the flight. Apollo 12 now at an altitude of 170 851 nautical miles. Its velocity now reading 2579 feet per second. Capsule Communicator, Don Lind, has just passed along family reports to the Apollo 12 crew. We'll play those for you now.

CAPCOM Apollo 12. Houston.

S/C Go ahead.

CAPCOM Roger. Just checked with your families. Pete, Jane reports that they have had a very quiet Sunday afternoon there. Everybody is home and everybody is well. There just really is not much excitement going on - it has just been a very quite afternoon over at your house. Dick, Barbara says -

S/C Okay.

CAPCOM Barbara reports to you, Dick, that Sharon and Lynn Diamond are over for the evening and they are expecting the Irwins over momentarily and Jim McDivitt just left. She says the boys have gone back to school and she thought things were going to be pretty quiet but between Barbara and Karen, she has so many giggling girls around there that it is more noisy than she thought. The other thing she pointed out was that Father Connley had been over and had noticed Barbara having a nap this afternoon and coming out of church this evening he commented in front of some of the people standing there in the church that the last time he saw her she had been asleep and this was much to her consternation. Also, Barbara asked that you guys talk a little bit more. She said she certainly expected more conversation out of you than she has been getting. Al, your wife reported that they are all missing you. They are extremely proud of you.

CAPCOM Apollo 12, Houston. How do you hear me?

S/C Houston, 12.

CAPCOM Roger 12. How do you hear now Pete?

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston.

S/C Hello Houston, 12.

CAPCOM 12, Houston. Do you read?

CAPCOM Apollo 12, Houston.

S/C Houston, 12. Are you locked up now?

CAPCOM Apollo 12, Houston. Do you read me now?

S/C I heard you loud and clear. How us?

CAPCOM I read you very fine. Sorry about switching antennas there. Al, your - as I started to say - your wife says that the family is missing you and they are very proud

of how the flight is going along and they all will certainly be watching tomorrow. The children are all fine.

S/C Great. Great. We are not getting you at all, Don. What are you having - a site handover or something. We have only gotten about two or three words in the last 5 minutes.

CAPCOM Roger. How do you hear me now? We just switched the antennas.

S/C Roger, loud and clear and you started cutting out after you said that Father Conley was over when Barbara was taking a nap. Can you go back to that point?

CAPCOM Oh yeah. Father Conley had been over in the afternoon and had seen Barbara taking a nap so coming out of church this evening in front of some of the members of the congregation she said the last time he had seen her she had been asleep and this was very embarrassing to her at the moment. Also -

S/C Well that is better than what he could have said (Laughter).

CAPCOM Also, Barbara had the comment for the whole crew that she is a little disappointed about how much you are talking. She certainly expected that you would talk more than she has been hearing lately.

S/C We're talking. She is just not hearing.

CAPCOM She also requests that when you talk try to be a little funnier. Al, I talked to your wife. She said that the family are missing you and that they are extremely proud of how the flight has been going. They will be watching tomorrow and also she wanted you to know that all the children are fine. This evening when Amy was going to bed she went to her mother and said "I want to see my daddy - I want to touch him." So you are being missed. Also, she concurs with the decision on the tuna fish. She definitely was happy that you didn't eat the day-old tuna fish. That is about all the family has to report.

S/C Okay. Thank you Don.

CAPCOM One other item for Pete. The Board of Directors has had a meeting and the VFR has been replaced with IFR Conrad from now on.

S/C I understand, Okay. Very good.

CAPCOM Roger.

S/C Don, we have all decided up here that we are going to have to get another Saturn V right because we sure missed the last one.

CAPCOM Very good.

CAPCOM Apollo 12, Houston.

S/C Go ahead, Houston.

APOLLO 12 MISSION COMMENTARY, 11/16/69, 21:25 PM,CST, 59:03:00 151/3

CAPCOM Things are going so well, we have decided that you do not need a state vector update at this time so things are going along very nicely.

S/C Okay. What is your first hack on MCC 4?

CAPCOM Just about 3 feet a second.

S/C Are we going to do it or not?

CAPCOM We are still evaluating.

S/C Okay.

PAO Apollo Control, Houston. That was Dick Gordon that suggested the Apollo 12 crew might need another ride on the Saturn V. We are at 59 hours, 10 minutes now into the flight and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, CST 2151, GET 59:29 152/1

PAO This is Apollo Control Houston at 59 hours 29 minutes now into the flight of Apollo 12. Apollo 12 presently at an altitude of 171 497 nautical miles. Its velocity now reading 2560 feet per second. We've only had one brief conversation exchange with Apollo 12 since our last report and we'll play that now.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Would you give us H2 tank heater No. 2 to AUTO?

SC H2 heater No. 2 to AUTO.

CAPCOM Roger. Thank you.

SC Your welcome.

PAO That was Commander Pete Conrad aboard the spacecraft and at 59 hours 30 minutes into the flight, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston, at 59 hours 39 minutes now into the flight. Apollo 12 presently at 171 728 nautical miles in altitude. It's velocity now reading 2554 feet per second. We'll pick up a conversation in which Al Bean describes looking at the sun with binoculars.

SC Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC We've been looking out at the sun with our binocular and we put the sun glass that goes with the telescope over the front of it and been looking at the sun and it looks like there's two or three dark spots on the left rim of the sun, maybe thirty-forty degrees in about the equator. Other than that, we can't see anything else. Over.

CAPCOM Very good. If they are thirty or forty degrees in, you won't have to worry about any sun particles.

SC Who's worrying.

CAPCOM Sounds like you guys are having a real good review of astronomy this afternoon.

SC We've been studying astronomy, geography, geology and a few other things up here.

CAPCOM Roger.

SC Really not a lot to do on the way out. You've got the systems to monitor and you've got to eat, keep yourself clean and get some sleep and except for that you are free to do a little looking out the window and studying the checklists and maps that you are going to be using when you get to the lunar orbit. It's got to be a pretty pleasant trip. We'll make it all up starting tomorrow.

CAPCOM Beano, this is your old social director speaking. One thing I'll guarantee is those dark spots on the sun aren't clouds.

SC I thought it was particularly appropriate since we are going to the Ocean of Storms until we bailed out of the earth. Just to one of them.

CAPCOM How about that.

SC We thought for a minute we had a caution and warning failure because they all came on.

CAPCOM I understand.

SC We talked about it before and King says don't worry, he says if you ever have anything go wrong in flight it will be something you have never seen before in your life. He was right.

CAPCOM Yes. That's the way it always happens. One thing you've got the advantage of us. We couldn't see the moon until we got just about nearly to it by westerly sight. You've probably got a pretty good view of it now.

SC Yes. Of course it's getting - the illuminated portion as we move out in front of it is getting less and less all the time. We are really beginning to notice that we are seeing less and less of it.

CAPCOM Roger.

SC Houston, since we've not doing MCC-3, do they want to do an alignment here or do another REFSMMAT alignment?

CAPCOM Negative, we don't need that.

SC Okay. How's that passover looking this morning?

CAPCOM (Inaudible) looking pretty good. We'll try to get you some drift numbers.

SC Okay.

CAPCOM Apollo 12, your drifts are 1.2 MARU on all axes or less. One of them is even lower than that.

PAO This is Apollo Control, Houston. The gentleman in Mission Control Center who prefaced this conversation with Beano, this is your old social director is Colonel Tom Stafford who, as you will recall, was the commander on Apollo 12. Shortly after Tom came on the line, the commander of Apollo 12, Pete Conrad, chimed into the conversation. We are at 59 hours, 44 minutes. We've just picked up conversation with the crew again and we'll start that now.

CAPCOM Apollo 12, Houston.

SC Sure is. Did you learn any special tricks about viewing the earth and the moon that you think we haven't tried?

CAPCOM No. I think we passed on all the basic information and it is quite a view to see it rotate through the windows there and take pictures of it.

SC (Garble) to hear me tell Al which lights are on if we have an electrical problem. Friday, all I could do is look over to him and say "Hey, Al, they are all on".

CAPCOM We could probably plan some good simulations from now on.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Did you get that drift report. Your platform is less than 1.2 MARU on all axes?

SC Roger.

PAO We are at 59 hours 46 minutes at present and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, CST 2209, GET 59:48 154/1

PAO This is Apollo Control Houston, 59 hours 48 minutes now into the flight. Apollo 12 presently at 171 942 nautical miles. Its velocity now reading 2548 feet per second. Tom Stafford has just called the crew to ask about their sleeping bags and generally carry on a chat session. We'll switch that conversation now.

CAPCOM Apollo 12, Houston. How's your sleeping bags working out up there Pete? Over.

SC Real good Tom. The first night I slept in the bag and Al slept in the bag and Dick slept up in the seat he - didn't sleep very well. And last night, I slept up in the seat and Dick slept in my bag and all of us like the bags. And one of the problems that the seat is that I'm going to take care of that - it's rattling around in here and every time somebody stirs down below the seat bangs off the wall and that naturally wakes up the guy that's sleeping in them you kind of spring load it anyhow.

CAPCOM Roger. You getting plenty of sleep, over.

SC Yeah. I'm getting more than I need.

CAPCOM Ah good Dick. The reports look real good down here.

SC Hey Tom. What do you thing of our RAD count?

CAPCOM Say again.

SC What do you think of our PRD count?

CAPCOM Stand by 1 Dick, I'll check.

CAPCOM Well from down here it looks like the total RAD count showed that you got practically nothing up there.

SC Well, I wouldn't go so far as to say we've got nothing.

CAPCOM At least they call it 90 milirads.

SC That's less than 1/300ths of what atomic workers can get.

PAO Apollo Control Houston. That was Pete Conrad first talking with Tom Stafford; then followed by Dick Gordon. We're at 59 hours 50 minutes into the flight and continuing to monitor. This is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 60:17:00, CST 22:39, 155/1

PAO This is Apollo control, Houston, at 60 hours 17 minutes now into the flight. Apollo 12 presently at an altitude of 172 658 nautical miles. It's velocity now reads 2527 feet per second. We have not spoken with the crew since our last report, and the atmosphere in mission control, at this time is quiet. As the various flight controllers making notes, looking into their consoles and planning ahead for a more active day tomorrow. We're at 60 hours 18 minutes and this is Apollo control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, 23:01 CST, GET 60:40:00 156/1

PAO This is Apollo Control, Houston, at 60 hours, 40 minutes now in the flight. At the present time we show Apollo 12 at an altitude of 173 196 nautical miles. Velocity now reads 2512 feet per second. Still very quite in the Control Center and at 60 hours, 40 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/16/69, GET 60:54:00, CST 23:05, 157/1

PAO This is Apollo control, Houston, at 60 hours 54 minutes now into the flight of Apollo 12. Apollo 12 presently shows an altitude of 173 531 nautical miles above the Earth. The spacecraft velocity now reads 2 502 feet per second. Capsule communicator, Don Lind has conversed briefly with Apollo 12, and we'll play that conversation for you now.

SC Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC Roger. At 61:15, do you want a 02 fuel cell purge and waste water dump like the flight plan calls for?

CAPCOM That's affirmative.

SC Okay. What do you want us to dump the water to 10 per cent?

CAPCOM 12, we'd like to recommend that you dump to zero since we're going to have quite a time before we'll have another opportunity for dump.

SC Okay.

PAO That was lunar module pilot, Al Bean aboard Apollo 12 talking with Mission Control in Houston. We're at 60 hours 55 minutes, and this is Apollo control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/16/69 CST 23:41 GET 61:19 158/1

PAO This is Apollo Control of Houston at 61 hours 19 minutes now into the flight. Apollo 12 continuing on its course to the moon presently at an altitude of 174 130 nautical miles. Continuing to slow down, it's velocity now reads 2485 feet per second. Pete Conrad just called in and received a bit of a surprise. The gentleman at the Capcom console at least for this moment, is Dave Scott, backup commander for Apollo 12. We'll switch to that conversation.

SC Houston, Apollo 12.

CAPCOM 12, Houston.

SC Roger. One waste water dump. One O2 purge coming up.

CAPCOM Roger.

SC Who's that? David?

CAPCOM Good ear.

SC What are you doing up so late, David?

CAPCOM Watching after you.

PAO Apollo Control, Houston. As was previously reported, midcourse correction number 3 was deleted from the flight plan. The requirement for the midcourse correction number 4 burn is still being evaluated at Mission Control. In any case, if this burn is accomplished it's magnitude will be at most very small, perhaps in the order of 3 feet per second. Television is scheduled for tomorrow morning, which is rapidly approaching for tomorrow morning at 1:52 a.m. Central time and as reported by the crew earlier they will probably move their lunar module transfer time forward to coincide with the 29 minutes of television which will be carried live. We're at 61 hours 21 minutes into the flight and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, CST 00:10, GET 61:48 159/1

PAO This is Apollo Control Houston at 61 hours, 48 minutes now into the flight of Apollo 12. Our displays presently show Apollo 12 at an altitude of 174 824 nautical miles. Its velocity now reads 2465 feet per second. Since our last announcement, we've had only one brief contact with the Apollo 12 and we'll play that for you now.

CAPCOM Apollo 12, Houston. We see zero on your waste water. Thanks very much.

SC Okay.

PAO This is Apollo Control Houston. Meanwhile in Mission Control Center, Houston discussions have been taking place regarding the possibility of moving the television time forward or in advance of that shown in the Flight Plan. These times have not yet been definitized. As soon as they become known to us we will pass them along immediately. We're now at 61 hours, 49 minutes into the flight and this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 62 hours 1 minute now into the flight of Apollo 12. Apollo 12 presently 175,119 nautical miles away from earth. It's velocity now reading 2,057 feet per second. A change of shift is presently taking place in the Mission Control Center with Cliff Charlesworth's green team of flight controllers relieving Pete Franks' team of orange controllers. Meanwhile we have had a little over a minutes worth of conversation with Apollo 12 and we will play that for you now.

S/C Hello Houston, 12.

S/C Hello Houston, 12.

CAPCOM Go ahead, 12.

CAPCOM Apollo 12, Houston. Go ahead.

S/C Hello Houston, Apollo 12.

CAPCOM Apollo 12, go.

S/C Roger Houston, looks like that water dump is kind of low on PTC, I was just wondering if you want us to do anything with it, or to standby and wait until the fixed attitude at 63 hours.

CAPCOM Roger, we followed your water dump maneuver. Way 1. 12, we'll just continue to watch your attitude changes for a while and if anything - if your YAW drops too far, we can come out of it, but let's stay in the attitude you're in now for a while.

S/C Okay.

CAPCOM Use TTC for while, is what I intended to say.

S/C Roger, I understand.

PAO Apollo Control, Houston, we still have no firm time yet for the next scheduled television transmission. However, there is a very definite possibility that this time will be moved forward from the 63 hours 30 minutes, ground elapsed time as reflected in the flight plan. We will pass along an update time, as soon as it becomes available and at 62 hours 04 minutes into the flight, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, 62 hours, 21 minutes ground elapsed time. Apollo 12 presently is coming out of the passive thermal control mode, bar-b-que mode going to the attitude hold mode because of disturbance set up by waste water dump, also because of the LM checkout, which is scheduled, - normally starting at about 64 hours however, there is some discussion going on here in the control center moving that up, also, accompanying the television transmission from the spacecraft. We're standing by for a resumption of conversation, but meanwhile, we have some 3 minutes of tape accumulated. After that's played back we'll leave the line open so that further discussions of moving these activities forward somewhat will be picked up. Let's play back these tapes at this time.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Just want to remind you to charge Battery B, please.

SC Roger. Battery B charged.

CAPCOM Roger. Thank you.

SC Houston. 12.

CAPCOM Go ahead, 12.

SC Houston, Apollo 12.

CAPCOM Apollo 12, Apollo 12, Houston. We read you.

SC Houston, Apollo 12.

CAPCOM Apollo 12, Houston. Go.

SC Houston, Apollo 12.

CAPCOM Apollo 12, Apollo 12. This is Houston.

Over.

SC Houston, Apollo 12.

CAPCOM 12. Houston. Go.

SC What's going to be the roll angle, so we can start thinking about where we're going here - for this TV?

CAPCOM Roger. Your roll angle is 285 degrees, pitch 90, and yaw is 0.

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM Roger. We've got a checklist change for you for coming out of PTC. Would you open your checklist to page F-97? Over.

SC Roger. Got it. Go ahead.

CAPCOM Okay. On step number 1 to exit G&N PTC because your so far out of the dead band you ought to put your man at 3 to excell command before you put your auto RCS selects to made A and B. And we suggest we put this into the checklist change for good.

SC All right.

SC Yes. That sounds good. Okay.

CAPCOM Okay. And we think you probably ought to

CAPCOM come on out of PTC now. That's one of the reasons why we're having a little trouble with COM.

SC Okay. And what we'll do - we'll slide on over to the 900285.

CAPCOM Roger.

CAPCOM Apollo 12, Houston.

PAO This is Apollo Control, some numbers while we're waiting for resumption of conversation, and the altitude above the Earth - here we go.

PAO Houston with a flight plan update.

SC Okay, Houston, ready to copy.

CAPCOM Roger. Your TV pass at 63 plus 00. Number 1 stop your PTC roll at 285 and this is what you need to put the sum through the hatch window. Step number 2 is your high gain antenna angles are: pitch 19, yaw 268. Step number 3, put the ALC switch to the IN position. And open the camera amperature to full open for your tunnel pictures.

SC Okay. Houston. We got it.

PAO Back to distance and velocity. 175 763 nautical miles out from Earth. Velocity now 2 439 feet per second. Continuing to monitor air to ground as the crew of Apollo 12 prepare to man intrepid for housekeeping chores and fairly extensive checkout of the Lunar Module.

SC Houston, Apollo 12.

CAPCOM 12, Houston. Go.

SC When do you want us to start this show, now?

CAPCOM Pete, we're ready whenever you are. Your option.

SC Okay. That's what I figured. We're starting to pressurize the Command Module now and we'll start here directly.

CAPCOM Okay.

END OF TAPE

PAO This is Apollo Control. The spacecraft apparently now in attitude hold. We've had solid lock-on with the high gain antenna through the Goldstone 210-foot dish. We're standing by now for the television transmission and the subsequent manning of the lunar module, Intrepid. Standing by live on the air-ground circuit.

SC Hello, Houston. 12.

CAPCOM 12, Houston. Go.

SC Okay. We're coming up clocks at this time and we're getting ready to give you the TV. Al will get it going in just a second.

CAPCOM Roger. Standing by.

SC (garbled) properly dressed.

SC Jerry, we've got to dress Al yet. We've have to put on his hat.

CAPCOM Roger. Lights, camera, action.

SC (garbled)

SC (garbled) let me get over here where the sun comes in.

SC Shortly too.

SC There you go.

SC No, B

SC Okay

SC Okay. You're putting it out. Wait a minute. You got it on the ground yet, Houston.

CAPCOM Not yet, Pete.

SC Okay. We'll hold till you get the picture.

CAPCOM Okay. We're not copying any FM downlink as yet.

CAPCOM 12, Houston. We have you in blushing black and white. And -

CAPCOM 12, Houston. We have you in blushing black and white. And the color is coming in now.

SC Roger.

SC What happened to the color?

SC There you go.

CAPCOM Takes a little for processing.

SC Okay. As you can see, Dick's up there in the tunnel and he's opening the vent valve now and he's starting to pressurize the LM.

SC Okay. We have a DELTA P of about 2.3 at the moment. Okay. It's going down to about 22.

SC Well, no. The DELTA P went up when we pumped up the cabin.

SC DELTA P is 18. What's the cabin? Okay, just about do it. We're down to 1.3 DELTA P. Okay, 1 psi DELTA P.

SC No longer equalizing the cabin. Houston, the attitude that you have us in, out our number 1 window we have the Earth, and out the number 3 window we have the sun shining in, and out the number 5 window we have the Moon. And, of course, we're too far from either the Earth

SC or the Moon to see any motion so it just seems to us that we're in suspended animation out here.

CAPCOM Roger.

SC What's the cabin pressure, Al?

SC Yes, it is. And you just brought the cabin rig on and that ought to be okay so - -

SC (garbled)

CAPCOM We're reading you 47 on your cabin pressure now and Al we're not reading you at all.

SC (garbled)

SC How do you read me know?

CAPCOM Okay, now, Al.

SC Okay. And the hatch is open.

SC What in the heck is this thing doing up here? Here it goes - there's another one right there. You may not want to move it. There you go.

SC About right.

SC Okay. Pretty good - how's the lighting down there, Houston. Looks pretty good on the monitor.

CAPCOM It's very good. We have a good picture of the hatch.

SC That's your feet up on the window there, Pete.

SC (garbled)

SC Okay. Let me get the hatch bag open so we can get it in. This big old hatch wrestles pretty easily here in zero g.

CAPCOM Beats one g all to heck, doesn't it?

SC Sure does, Jim.

SC (garbled)

SC Dick's putting it under the left-hand couch now. If we move down there we (garbled).

END OF TAPE

SC Dick's putting it under the left hand couch now. If we move down there we (garble).

CAPCOM I just noticed, 12, the outer side of that hatch makes a pretty good light reflector. So you might keep that in mind if you ever need a light at that place.

SC It sure does. Did you notice that, too?

CAPCOM Affirmative. It really lighted things up.

SC Okay, now we're going to get back up there. We'll get up there again and take the tools out. As you recall, we've had it in and out of there several times already. And the procedures are very simple. Now that we've done it we've already pointed the nitrogen out but I'll have to set that button anyway just for procedural purposes. I had my preload handles all set and everything. We'll unlock the temperature latch, lock, and we'll extend the strut. The umbilicals are already disconnected and stowed.

CAPCOM The lighting in the tunnel is just a tad dim but we can make out what you're doing.

SC That's wide open on the S-stop now, Houston.

CAPCOM Roger.

SC I think part of the problem is there's a lot of contrast between that dark tunnel and the white garment of Dick's. It's giving the camera a little shift. Okay, turn the capture light release alternated 180 degrees and all I have to do is pull the tools out of there. Okay, when she comes. All right, while Dick's stowing that I'll go up and get the drogue. You got any late night watchers, Jerry?

CAPCOM That's affirmative.

SC Al, can you pull up your seat please? Okay, just a second and I'll have to move the camera. I'll hold the camera here. I've got it. Okay. I've got it, Dick. I've got it just fine. Okay, Dick's putting the probe now under the right hand seat and he's going to have to strap that in with something just enough to hold it there. Let's see if I can scoot around and give you a shot of it. I caught him right down in there. Okay. Okay, Pete, we're ready for the drogue. Coming down. I'll let you juggle with this thing every time. Al, you got it out in the (garble) that's one reason. At your right hand, there you go. Boy. Hey, move back that way and I'll take it away from you.

CAPCOM Sounds like you're handling empty milk cans up there.

SC Okay, you want to look at the drogue you're up there docking? That's right. Turn it around, but don't let any light hit on it, Dick, or I can't see it. How's that? Too much light. Shut it. Keep it up or move it over to the left or right. It's got a little circle of light on it. How's that? Is that better? I'll move directly away from you. There's the drogue after one docking.

CAPCOM Roger. We can't see too much because of the big light spot on it.

SC Okay, why don't you stash that, Dick, and stick - Dick Gordon looking through the hole. Hello, there. The only mark on it is somewhat a marked starch, Dick. You hit it almost deadcenter when you dock it. Yes, right there. That's funny. That mark looks just like a nose. About the same length too. Okay, Al, you want to stick her up here or - It just has to stay open. Okay, go ahead, Pete. All right.

CAPCOM Okay, 12, the lighting in the tunnel looks pretty good now.

SC Okay, if you'll hold it just a minute, I'll get the window shades down in the LM here. There he goes. I don't think so. Don't you think? I have to transfer with these things, Dick, right here. Okay, I'm going over but you'll have to hand us these goodies. We'll stick them in the LM. Hey, it looks like there's good lighting up there. (garble)

CAPCOM Roger, 12. Lighting is very good.

SC Okay, we're going to - Hand me the hoses first. Let me get some air going. Okay. Here, I'll get up there. Just sling me the book, Dick. Okay. And do you want to hand the long hoses up? We're putting the CSM hoses down inside the LM since there's no ventilation in there now. We just lay them around down there where we're going to be working with the LM and it makes it real nice for cooling and gives us clean air down in there. Without it gets a little stale after awhile. Okay. Why don't I just go through and show them how it looks. Okay? Go through the tunnel. Okay. It's pretty easy. Just float on up. Only problem is when you get in here we're going to be upside down and then you got to decide which way right side up. Hey, I see the camera. There you go. Now I'm going to check this line. It may not be as long as ywe'd like. That's it right there. So we'll probably have to turn around upside down when we dive in there. I tell you what. Let me scout those items and I'll hand them into you, Pete. All right, what are you looking for? Hand me the book and I'll do it. Toss them into you and you can put them up.

CAPCOM 12, Houston. We had a pretty good view of your ECF modular and now we're getting a good view of the main tunnel upside down.

END OF TAPE

CAPCOM ... upside down.

SC We discovered an interesting thing while we were in here the other day. The AOP looks right into the Command Module rendezvous window and I was looking out to see what I could see and I saw this face looking back at me and it was Dick in the other window.

CAPCOM Roger. Did it scare you?

SC Should have hop here. (laughing) It's quite warm in here today. The way we stop has the sun coming in through one window and it's heating it up pretty good in here.

CAPCOM Roger. Looks like the sun's coming in through the CDR's window.

SC Yeah, that's right. Here's a box of kleenex, Pete. Coming in, right by you. Got it. Next one's two towels. I'll go get them.

CAPCOM We just had a good view of the PLSS and down there on the floor between your legs.

SC Yeah. I can't get down any further. My COMM line won't allow me to go any further than I am right now so I got myself velcroed to the top of Al's PLSS.

CAPCOM Okay. That's a good view of it right there.

SC I'm just giving you a two bit tour, Jerry.

CAPCOM Roger.

SC When we were in the other day we rigged the Hey, here comes - Whatch ya got Al? Yeah, here comes a couple of towels. Both of that and the kleenex go in the left hand storage compartment. Let me get the 16 millimeter magazines and 70 millimeter magazines. Hey, Al. Why don't you come up here and let me get those for you. Okay. That sure was a good idea and then maybe I can say a few words about this here. Well, as a matter of fact you're going to have to do that Al because I can't get any lower on this COMM cable. You're the only one that can get down there. All right, I'll hold the camera, Dick. We have a three way switch here in the tunnel. Okay, I'll just come on past. Okay. Dick. Okay.

CAPCOM We just had a good view of your helmet stowage bag down there a couple seconds ago.

SC Al, here's the kleenex and the towels.

CAPCOM Looks like you're trying to pack a telephone booth.

SC You could jam her in here, Jer, bring it around the corner. Okay. Let me put those in their proper spots. Okay, what we've got on this side, Jerry, is what we call a left hand side stowage compartment and it's pretty unique in that it's made out of beta cloth and with these snaps you can see we can remove it. So what we do after the first EVA we put a lot of our things that we don't need anymore

SC inside these bags and then we can put them outside on the Lunar Surface and after the second EVA we can put some other things in this other or the backend side of this stowage compartment and then put it out on the Lunar Surface also, so we end up being able to very tidily put some of our gear on the outside of the - outside the spacecraft so we'll be a lot lighter when we get ready to leave the Lunar Surface which is handy since we got more rocks and what have you.

CAPCOM Roger.

SC (Garbled) You can also see in the picture the restraint straps that are hooked up above that, used to hold us in for landing. There you go. Yeah, this is what Pete's talking about. Okay, got somemore goodies. Garbled 70 millimeter magazines. There's two of them. These are the two that go here in the PSB (pilfer and stowage bag). ... going ISA. Right. Just a second. PSB stapler stuck away. Take a look in here and we'll see how this looks. Let's poke them right in here then they'll be here tomorrow. Open this up.

CAPCOM 12, Houston. Our color TV is running about 11 seconds behind your voice and so what you're talking about we're seeing about anywhere from 10 to 11 seconds later.

SC Okay. I've been just staying with that due to the process.

CAPCOM That's affirmative.

SC What we are doing now is putting the - two of the 70 millimeter magazines for Hasselblads in the stowage container here. Those are the two that we're going to use when we first get on the Lunar Surface. Here's three more and these three will be used the second EVA and so we'll stick them over here in the right hand side stowage compartment. The right hand side isn't removable at all as you probably know. We'll go ahead - the cameras and film that we bring back from the Lunar Surface we'll put all of that material over here on the right hand side, a lot of it anyway because the left hand side won't be there. As you're looking now then on slipping that beta cloth bag in its place on the right side.

CAPCOM Roger.

SC Okay, here's the 16 millimeter film.

CAPCOM Okay.

SC The same thing with the 16 millimeter film you'll be seeing in a moment. Okay, there's just one of those, Dick, and that's in A8. That's the whole package just here? That's it. Okay, as you see I'm just about to put the 16 millimeter magazines in their stowage compartment. In space aft as you can see is not alot of room so you end

SC up having to put every item in its own little place. As you can see as the film - magazines go in they fit into a tidy little (two talking at once) cloth bracket. And if Pete gives you a complete look at that right hand stowage compartment you can see we've got quite a lot of ditties here. Down here we've got a spare -

CAPCOM We're getting a good view of the right hand compartment now and we can see your helmet stowage bag down there in the corner, that spherical white bag.

SC Right. Right in here we keep some spare bulbs for the coas. A little bit higher up we've got sun filter for our telescope. Yep, and it's marked. There's the coas filter. It's the pilot sighting device. The waste stowage bags are stored in the bottom two compartments. In here, I hope, is our Hasselblad camera, at least one of them. We have two of them. Yes, there it is.

END OF TAPE

S/C In here, I hope is our Hasselblad camera, at least one of them, we have two of the. Yes, there it is, got to put it together right now. It is just a camera itself, we'll have to put the magazine on later and the handle and all the attachments throughout can be fixed to our PLSS.

S/c RCU, where's RCU.

S/C Is that all of the transfere.

CAPCOM Roger, Al, that's the color camera your going to use on the lunar surface, isn't it?

S/C No Jerry, we don't have the color camera that we're going to use on the lunar surface inside the LM. It is outside on the ray side it is gonna be just like Apollo 11. When Pete goes down the ladder, he will pull a handle, it will lower the measa and then the TV will be pointing right at the lower part of the ladder so that everyone can see when he steps on the surface. We'll later put that out on the lunar surface on it's tripod and we will be able to move it around so that everybody can see from both of our EVA's. Those 2 cameras, I only showed you 1, the other is right next to it, are the 2-70 millimeter still cameras, they hook right on the front of the suit, so that you can take still pictures of rocks, the surveyer when we get there and ALSEP and what have you, while we are walking around.

S/C Jerry, I'm showing you a picture of the instrument panel, right now, but what I'm more interested in, on my monitor I can see the dust particles, maybe you can see them down there on the TV. I think that's pretty good resolution.

CAPCOM That is, Affirmative Pete.

S/C They had to be floating in the sun light - they just happened to be floating in the sunlight that's in here. Of course, there is a little bit of - it's very light dust, but it looks big on the TV screen because the sun is illuminating it and of course, as soon as we start running the ECS system in here it will clean it all out.

S/C Ok, I am going to start doing that right now, just opened the percent H2). I'm opening the percent O2 Pete, and going to cabin repress auto and when I do you are going to hear a bang so stand by for the bang.

S/C Dick, standby for the bang

S/C Ready for the bang.

S/C Ready, Okay. Get set. And the cabin repress circuit breaker is gonna go boom. Accute isolation valve both (garble) flow and then actuate override (garble). If you will just wait a minute I've got to get the camera on all that good stuff.

S/C Alright.

CAPCOM 12, Houston. We can see the dust particles very well.

S/C Okay.

S/C This is a shot of the 2 disconnect valves.

S/C Did you show where both of our presses were started, we got one over here, Pete, the other side one on the bottom. I didn't know one of the floor, one right in front of the hatch.

CAPCOM 12, Houston. We see the one on the floor.

S/C Okay.

CAPCOM So if you can show us the one over on the side you are in good shape.

S/C You pull this back right, I don't know you will have to back it up a few more feet.

S/C It's pretty tight quarters in there. I don't know, your gonna have to back the camera up.

S/C Okay, why don't I do that.

S/C Take a look at the monitor.

S/C Make sure we don't get too much

CAPCOM That's a good picture.

S/C Did you get that last item?

S/C Yes, Pete's PLSS is on the wall behind him. When we suit up we won't have a lot of time to talk to you on the lunar surface. What we do is, Pete gets over on his side, which is the left side of the spacecraft, this side over here. My wheel on the right, I'll take my PLSS off the floor and put my OPS on top of it, Pete will do the same thing with his, then he'll put - hold my PLSS up while I put it one, which takes about 10 or 15 minutes to get my PLSS on and connected. Then I kind of back over in my corner and hold his PLSS, he turns around and puts it on. It's not a lot of room here, as you can see and when you are fairly bulky with your suit on, your PLSS is on, your helmet and the whole business, you have to be careful that you don't bump into the - any of the parts of the LM. I'm showing you by PLSS again. It is still bright here so I am gonna have to be careful about this camera. This is a hell of a storage bag.

S/C Hey, Al, I wonder if it's at all possible for you to start the camera down and show them the window.

S/C The markings on the window, that's a good idea.

S/C Yea, the (garble) is really illuminated there in the sun.

S/C Okay, let's just see if you can get over there near it.

S/C Alright.

S/C Maybe we can show where your standing there.

S/C Okay, the light just went out, Houston, because I've stopped the camera on the way down.

CAPCOM Roger.

S/C What I'm gonna try to show you, without bothering the camera. Yea, but we don't need since I've got it.

CAPCOM 12, Houston, what's the configuration of your suit ISO valve now?

S/C We opened and closed it, for the check list. They are both in suit disconnect.

S/C It is getting awful bright, it is liable to bother the view.

S/C There you go.

S/C Is that to bright on the ground, Houston.

S/C (garble) Intercept 22.

CAPCOM I can't tell Pete.

S/C Your looking at Houston.

CAPCOM Roger, we can see the scribe marks on the window.

S/C Okay, what happens is Pete stands right behind those scribe marks you can see right at the top there's -- where the horizontal line, that's zero degrees and then there's a 10 down 20 down and 30, 40 and on down. Right at the top at left and right, there is also some angular marks. As we proceed in the descent, and we pitch over where the lunar surface is visible about 7,000 feet, Pete's gonna be looking out through the window at those marks. I'll be reading from the computer, and the computer will say where it is taking us to land, relative to those marks for example, probably the first thing you will hear me say is 42 degrees, so Pete will look out at the 42 degree mark and he will see if that is the surveyor crater. We spent a lot of time learning, which crater the surveyor is in and a lot of the more interesting craters around there, more easily identifiable craters. He will look out and see if the crater's in the right place and if the 42 degree mark's in the right place, if it is it will just continue on the present trajectory. If not, he can use his control stick to put a certain number of inputs in to change the direction we are heading, for example, if he saw it at 40 degrees instead of 42 degree, for the crater we wanted, he could pitch down a couple or pitch up a couple, depending on what he wanted to do. If he say it at 40 he would pitch down a couple of hits of the stick and hopefully very shortly, the computer would notice this and start heading for the 40 degree point. I continue reading the numbers and he continue monitoring them all the way down. When we got down to a low altitude then, we would be in a good position for Pete to take over manually and land next to the point we are headed for. This is called the LPD or landing point designator. It allows the commander to keep up with where the computer thinks it should land and then tell it to land at a different place, if he feels it should.

CAPCOM Apollo 12, Houston

S/C If you got any questions on that LPD, Houston, go ahead.

APOLLO 12, MISSION COMMENTARY, 11/17/69, 0128 CST, GET 63:16:00 165/4

CAPCOM Roger, I hate to change the subject on you guys, but it looks like you don't have your auto repress capability now. When you activated your iso valve, it looks like what you should have done is gone to the suit flow and then used your accuator over-ride, in order to set it up.

S/C How does that look to you, Houston?

CAPCOM We don't have PM we saw that on your TV picture when you were over there fooling with it and so far we haven't seen it again.

S/C Okay. We fixed it up for you.

CAPCOM Okay, thanks.

CAPCOM I think you pretty well covered that LPD situation. I don't know that there could be any questions.

END OF TAPE

SC Okay. We're readjusting it back inside now, Houston. Back over here, Al - Okay, let me run one of these windows here so I can check this AOT. Cut down your light and just leave it open a little bit. Your set of data AOT was beautiful. Push it around over here. (garbled)

SC Okay, Dick. I'm shining the camera down the tunnel at you now. The hat is awful bright in the sun as its - yes.

CAPCOM Hello, Dick. We can see it.

SC you shine - you reflect the sun, Dick. I can't keep it one you, you reflect the sun on your suits so bright. I'm very afraid its going to burn our minitor tube

CAPCOM Pete, you going to let Dick get any LM time?

SC Yes, he's been in and out with us.

CAPCOM Okay. Pete. I think we're finished checking this thing out.

SC They've got to Jerry. They get command module time.

CAPCOM That's right babes, equal time.

SC Ready to close up shop?

SC Okay. Are you going to open that window or not?

SC That's a no. We're through with the window.

SC Yeah, we're finished.

SC Still, do you have any more questions in the LM? Does anybody have any more questions down there or anything they want to see?

CAPCOM No, I guess not, 12.

SC Very good travel log.

SC All right, Dick. I think we can go on putting that up and then bring that camera in here and - -

SC I will set the camera over to your right now - -

SC Take a look at the Earth and the Moon.

SC Okay. Here.

SC Here comes the camera, followed by me. Toot. Toot. Watch it its wide open so - stopper down. There you go.

CAPCOM 12, Houston.

SC Okay. I'm going to close the cabin - - going to close cabin repress now.

SC Stand by for a (garbled)

CAPCOM 12, Houston. We heard the bang that time.
SC Yes. It sounds like about a 32 going off
in your ear.
CAPCOM Roger. And, Pete, on your way through
there would you give us another tunnel index reading?
SC Okay.
SC It was minus .3 the other day, Pete. I
hope it hasn't changed.
SC Fortunately, it hasn't. It's still minus .3.
And, Jerry?
CAPCOM Go ahead.
SC Heh, Jerry. Did you say that number 1
window on the television?
CAPCOM That's affirmative.
SC - - number one window on the television?
CAPCOM That's affirmative.
SC Say, Dick. What's this thing out the
window.
SC Pete, I need your damp rag. We ought to
clean this CSF tunnel hatch seal. Its got a bunch of junk
stuck on it.
SC Thank you.
SC Looks like all these circuit breakers are
just exactly like we left them brake set. Okay. That light
is out when the series up cabin cump valve opens. Is it still
open, Pete?
SC Cabin dump valve is still open.
SC Okay. The IVT and press on.
CAPCOM 12, Houston, t That's a real good picture
of the number one window there.
SC What have you got in the picture? Be
careful, Charlie.
CAPCOM There is a big white thing out there.
It looks like a piece of pie.
SC Yes. that's right.
SC Okay. Hand me the hose, Al.
SC Okay. Just double checking all these
things to make sure they were tidy.
SC Got them?
SC Okay, Jerry. I'll go over to the number
five window now.
CAPCOM Roger.
CAPCOM Notice the stuff on the number 1 window
is kind of linear looking. Linear stripe.
SC Yes. Its still open.
SC Did you light the seal yet?
SC Yes, I got it here. Just a minute.

SC Okay. I was going to lift this hatch up for you.

SC I had a problem there, Dick. Is the television line - is around Al's comm -

SC Okay, Houston. What do you have on number 5 window.

CAPCOM Roger. We can see the Moon out there.

SC How's it look?

CAPCOM Very, very slender segment. And its a real good picture of it.

SC Was the picture of the Earth any good?

CAPCOM Yes, it was pretty bright.

SC Before?

CAPCOM You couldn't really see much except just the segment of it.

SC Okay I had it stopped all the way down.

SC Hey, Dick, will you take that hose and stick it someplace? Thank you.

SC There you go.

SC How much are your wires. Let me go through there.

SC Looks like a snake pit.

SC That ought to do it.

SC Yes.

SC Hey, you and I are tangled up.

SC Okay.

SC There you go.

SC Okay. Let me slide back down here and try to get the seal off.

SC Things are going to do it?

SC I can see that now.

SC Okay.

SC Hey, Jerry, that's the earth again.

SC They carried out the (garbled), Houston. Is that a better picture?

CAPCOM That's a much better picture.

SC That land that you're looking at there is Australia.

CAPCOM Roger. We can't determine anything on the Earth there but it looked quite a bit more like the Earth now than it did before. It looks like you got it stopped down considerably more.

CAPCOM 12, Houston. The word is, Australia is getting your TV show live.

SC Roger. They're getting it live and I wish they could see their land mass. Its almost right in the middle of the Earth. And they ought to recognize the

APOLLO 12 MISSION COMMENTARY, 11/17/69, 01:48 CST, 63:26:00 GET 166/4

SC snow cap of South America - of the South Pole just below them.

SC Ho, ho.

SC I know its been said before but this is a really spectacular sight.

SC Australia is getting us live? I'd like to say hello to all the friends down there at the tracking station in Carnarvon if their down there.

SC How about using the control, Al.

SC Get that (garbled). See. Here it comes.

CAPCOM Hello, 12. Houston. Don't forget the troops in Honeysuckle.

END OF TAPE

CAPCOM 12, Houston. Don't forget the troops at Honeysuckle.

SC Hello, to all the troops at Honeysuckle. I've been to Honeysuckle though. What he's saying, Jerry, he's asking for a trip.

CAPCOM That's what I figured.

SC This one isn't long enough. This one's not long enough for him. Getting that in there, Pete? Yes. Jerry, when we go back to the other side turn to that mare again. We may have a better picture this time.

CAPCOM Okay, Dick. Here's the problem, right there. getting through this way and then standing like you want. Okay, there we go. There you go. There we go. Stand any way you like it. All right. I hope it is. Are you sure?

CAPCOM Okay, Dick, we're copying the moon now.

SC How's it look? (garble)

CAPCOM This is even a much better shot than the last one.

SC Do you see a place there you'd like to go?

CAPCOM I'd like to go anyplace there.

SC Okay, one drogue's in and somebody's pencil is floating by. (garble) Is it yours, Al? I'll check and see. Drogue over and that stuff now? Yes. All over camera, did you get the probe. We're going to change stations, Jerry.

CAPCOM Roger.

SC I'll put this circuit back under the seat where it belongs. Hey, Al, let me get up out of your way. Okay.

CAPCOM 12, Houston. On that moon shot it looked like we could see part of the lunar surface that's in the terminator and behind the terminator.

SC Good luck. We're having trouble doing that ourselves. Hey, do you realize that waste water dump was so propulsive. That really upset us there awhile back.

CAPCOM It sure did.

SC Has he seen that seal - Yes. That seal looked like the perfect dust collector or something. It was really dirty.

CAPCOM Fido says he really appreciated that dump.

SC Okay, we'll scratch the footset. Say again?

CAPCOM Fido says he really appreciated that dump.

SC Hand me the TV, Dick Gordon, and I'll give you some tunnel shots again. (barble). Go back inside and bring on the instop a bit. Dual rack out and focus. Giving you some more tunnel work, Houston.

CAPCOM Okay.

SC Dick Gordon's getting pretty fancy with that forward drogue. Those two exercises yesterday and - or three,

APOLLO 12 MISSION COMMENTARY 11/17/69 CST 01:58 GET 63:36 167/2

SC I guess, counting the original one. All right. Pete, go around and turn around the other way. Here, I'll hold the camera. All right. You got it? I got it. There you go. Hold it out of the light. All right. Here goes. Loop down here a little bit. After all the wrestling we've done with that probe in practice it's really amazing to see that big thing float around in here. Beautiful dishwashing. Looks like it will double up on half (garble) Okay. Probes are stowed. We're going to install a probe at capture latch release panel is forward counterclockwise to the cocked position. I put the probe under the drum. Pull on it. It's in there solid? And we'll put the latches in. Capture latch release handle is in in position? Capture latch is unengaged and now we'll put the installation strut on the wall. Okay, we've extended the handle to the full extension. Yes, and have we got the latch control back in place? That's what I'm doing, kid. You can see that. On either way. Okay. Back off a little bit usual. There you go. That's a good shot there. Hard to get a picture without a bright spot. That's why we move it around a little bit, so we won't burn our TV camera out.

CAPCOM We got a great picture right now and we're copying Dick ratcheting it.

SC Okay. Stowing the strut now. Okay, we've installed a probe and the ratchet handle is in the installation of strut. They're restowed and the probe is loose in the tunnel just for stowage. Capture latch release handle is set and in the lock position. And we'll verify the few little odds and ends on here. The ratchet pull is flushed for the housing. Preload shaft is up into the deep end and it's against the umbilical and we're going to leave the umbilical stowed all ready to put in the hatch. The hatch right here. Okay. Okay, we're looking at the outside of the hatch now. Have it out of the way for me? There's one down. Stow the strut and see where it was? Yes. This time I'll learn it. In case our friends in Australia are wondering, we got a, of course, the top hatch on the LM, which is the first thing you saw. Pete wiped off the seal and closed in and then he put on the drogue on the LM although we had it stowed in here a moment ago it fits on the LM and he put that in and, of course, it looks like a big inverted ice cream cone. When that was complete, in hopes to attach the LM. When that was complete Dick got out the probe which was attached to the command module and put it in the drogue, mated it with the drogue and then attached it to the command module structure and now he's put in the command module hatch. We undock around the moon in two days after passing through the single passageway. Dick will be in here by himself. We'll put the same hardware in and then when we undock he'll end up with this hatch to keep the seal

APOLLO 12 MISSION COMMENTARY 11/17/69 CST 01:58 GET 63:36 167/3

SC of the command module with the probe on the command

END OF TAPE

SC - and so when we undock he'll end up with this hatch to keep the seal in the Command Module and the probe on the Command - on the front end of the Command Module. We'll end up with the drogue on the LM and the LM hatch to keep the pressure seal in the LM and this is the way we'll be for the 35 hours or so that we're apart. When we get back together then he'll come in, dock his probe with our drogue and just the same as we are right now. We'll remove both hatches and the probe and the drogue and then we'll come back out of the LM into the Command Module. There's a lot of hardware and it's heavy cause the total vehicle weight right now is about 100 000 pounds and it has to be removable. That's it. You can turn the tunnel lights out and that's it. It's completely it. That little valve right in the center is the pressure equalization valve. There's a difference in pressure between the LM and the Command Module. We can take that valve and open it and it will allow the pressure to equalize thereby allowing us to open the hatch. That's this. It's got a handle with some teeth on it. Dick really ratches it around pretty good. Jerry, I think from the commarads to the folks at home we've enjoyed doing this for them. All three of us are in good spirits, we're feeling great, we've exercised and slept well, the food's been good, we have a lot of nice cold water to drink and we're sure enjoying the scenery, however, I'll tell you one thing we do miss the good people back home.

CAPCOM Roger, Dick. That was a great show and we really enjoyed our little tour down through the Lunar Module. Glad to see you guys are looking so good. You're sounding great and we'll be seeing you later.

SC Bye bye. Very good. Bye bye from 12.

PAO This is Apollo Control. We're preparing now to advise the crew to go back to passive thermal control mode now that the LM housekeeping has been completed, hatch is reinstalled, probe and drouge assembly. Total time on that - let's listen. It's set up well for start PTC.

SC Okay. We don't have to do anything but crank her OFF, okay.

CAPCOM Affirmative.

PAO Total time on the just completed TV pass was some 56 minutes even. TV came on at 62 hours, 52 minutes ground elapse time and the intravehicular transfer began at 63 hours, 4 minutes. We'll continue to monitor the air-to-ground live for a few more minutes.

CAPCOM Apollo 12, Houston. Select on the antenna Bravo.

SC OMNI and Bravo.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/17/69 CST 02:18 GET 63:56 169/1

PAO This is Apollo Control. It doesn't appear that the crew is going to have much more to say for the time being. Apollo 12 now 177 835 nautical miles out from Earth. Velocity now up to 1 380 feet per second. Display now shows the altitude at closest approach on the present trajectory altitude above the moon, that is, at 65.78 nautical miles. At a ground elapsed time of 83 hours, 28 minutes, 38 seconds, velocity at that time, at the closest approach will be 8 235.5 feet per second. And at 63 hours, 59 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/17/69, 0300 CST, GET 64:38:00 170/1

PAO This is Apollo Control, 64 hours 38 minutes ground elapsed time. Apollo 12, now 178,717 nautical miles out from the earth. Velocity 2,356 feet per second. We have approximately 2 1/2 minutes of accumulated tape of some minor conversations that have taken place in the last half hour or so, including a description by Conrad of some locations and land marks in Australia which he was able to see through the optics from the spacecraft. We listen to that tape now.

S/C Houston, Apollo 12.

CAPCOM 12, Houston, go.

S/C Hello Houston, 12.

CAPCOM Apollo 12, Houston go.

S/C Roger, are you going to let us know before we go to bed tonight whether we're gonna do MCC-4 or not?

CAPCOM I think we probably can, Pete. Right now it doesn't look too much like we're gonna do one.

S/C Okay, we'll stand by, just wanted to know whether we were going to know before we went to bed or not.

CAPCOM Pete, I think we can tell you before you hit the sack.

S/C Okay, very good.

S/C Houston, 12.

CAPCOM 12, Houston, go.

S/C It is amazing how well you can see when your looking at something you recognize, I've got the binocular here and I'm looking Australia and I can see 80 mile beaches, the area that that's in, is the area of Sharks Mouth Bay, just south of Carnarvon. It's very clear over in that part of Australia right now.

CAPCOM Roger, Pete.

PAO This is Apollo Control, and that completes the playback of accumulated tape at 64 hours 40 minutes, ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 66 hours 38 minutes ground elapsed time. Have had very little communications with the spacecraft Apollo 12, in the last hour. About 17 seconds of accumulated tape in 1 brief exchange with the crew, when they were advised to shut down charging battery B. I will play back all of that 17 seconds, right now.

CAPCOM Apollo 12, Houston.

S/C Go ahead, Houston

CAPCOM Roger, Battery B is all shot full of electrons now and you can terminate the charge.

S/C Roger, thank you.

PAO And that is sum total of words exchanged with Mission Control during the last hour. According to the flight plan the crew should be at this time in their eat period and going into their pre-sleep check list. 68 hours ground elapsed time about an hour one-half from now or an hour and 20 minutes, they are scheduled to begin the 8 hour rest period. Flight Dynamics officer Dave Reed advised the flight director, Cliff Charlesworth in the last few minutes that, right now it still looks as though mid-course number 4 will be unnecessary, but as they get additional tracking following the waste water dump, which apparently perturbed the trajectory somewhat, for another several hours and then they will have a better handle on whether or not there will be a need for the mid-course number 4 maneuver. The space digitals with the distance and velocity information is not being generated at this time and at 66 hours 40 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 67 hours 8 minutes ground elapsed time. 182 011 nautical miles out from Earth. At 2264 feet per second in velocity. We have some 41 seconds of tape to play back at this time.

CAPCOM Apollo 12, Houston.

SC Houston, 12. Go ahead.

CAPCOM Roger, 12. At this time, it looks like they'll be no need to schedule a midcourse for the next 8 hours or so if we have no major changes in the trajectory due to dumps or anything like that. It probably will be assured no midcourse four.

SC Okay. It looks like we don't have any (garbled) for the urine pumps we have but no waste water. Jim (garbled) your going to give us another 10 hours sleep tonight, huh?

CAPCOM Affirm.

CAPCOM Roger, Pete. Looks like your EKG indication has gone soured down here. Would you check your blue lead on your system there when you get a chance?

SC It works with exercise. We may have pulled it loose.

CAPCOM Okay.

SC How's it look now, Houston?

CAPCOM Loud and clear, Pete.

SC Say again, Jerry.

CAPCOM We're reading you loud and clear, Pete.

SC Okay. I just didn't reinstall it correctly.

CAPCOM You are now medically acceptable again.

SC Your major finally found his heart.

PAO This is Apollo Control. That last exchange regarding the commanders biomedical harness reconnecting it so that the flight surgeon John Zieglschmid could observe the commander's heart rate was a live transmission. We'll leave the circuit up for a few moments longer in case conversation resumes.

PAO This is Apollo Control. The line is getting quite noisy now as the spacecraft rotating 3 revolutions per hour loses lock with the ground and high gain antenna. At 67 hours 12 minutes ground elapsed time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 67 hours, 42 minutes ground elapsed time. The spacecraft communicator Jerry Carr is talking to the spacecraft now. Let's play back the tape and eventually catch up live.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. Are you about ready to give us a E mod dump?

SC Okay. Coming at you.

CAPCOM I've got your RCS consumables, if you're ready to copy?

SC Okay, Jerry. Go ahead.

CAPCOM Roger. To G.E.T. 67 plus 00. RCS total is 80.0. Alpha - 77.2. Bravo - 83.1. Charlie - 77.5. Delta - 82.2. Over.

CAPCOM Apollo 12, Houston. Were you calling?

CAPCOM Apollo 12, Houston.

SC Hello, Houston. (garble)

CAPCOM Apollo 12, Houston. How do you read.

Over.

SC Roger, loud and clear, Jerry. I'm reading you.

CAPCOM Okay, Dick, we lost your E mod dump about half way through. Would you try it again.

SC Hello, Houston, 12.

CAPCOM Apollo 12, Houston. How do you read?

CAPCOM Apollo 12, Apollo 12. This is Houston. How do you read?

SC Roger. I think I better switch it over. Are you interested in my onboard readouts?

CAPCOM Affirmative, Dick. And we'll need another E mod dump from you too.

SC Okay. Here comes the E memory. Confirmed Battery Charlie is 37.0. Pyro bat alpha - 37.1. Pyro bat Bravo - 37.1. Bat CM Delta V - plus .25. Over.

CAPCOM Roger. Battery Charlie, 37.0. Pyro Alpha - 37.1. Pyro Bravo - 37.1. Delta V - plus .25.

SC (garble) water - That's affirmative and water chlorination and a crew status report is negative.

CAPCOM Roger. We're going to need a Cryo stir.

SC You already have it.

CAPCOM Okay. And no medication. Right?

SC That's affirmative.

END OF TAPE

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. Would you verify that you changed canister number 6 out.

SC We sure did.

CAPCOM Okay, and ask Dick to give us a quick call. His last downlink was pretty rough and we suspect maybe it was mike position otherwise we may have COMM problems.

SC He's not on the COMM right now.

CAPCOM Okay. You're sounding pretty good. It must have been his mike and we've copied your E MOD dump and so that about wraps it up.

SC Okay. We're getting ready to sack out here and we still got to chlorinate the water yet. We're still cleaning up from dinner a little bit. Do you want us to wear biomedes tonight? We prefer not to. The two that are sleeping under the couches so that it doesn't interfere with our sleeping bags.

CAPCOM Pete, doctor says we can get along without them tonight but they definitely want it tomorrow night.

SC Okay. I think if they make different procedure they ought to rig these sleeping bags so that you can get in there without having to leave the hem open.

CAPCOM Roger, Pete. The biomed they need tomorrow night is just on you and Al.

SC Yeah, we're the two that are sleeping in the sleeping bags under the couch.

CAPCOM Ain't that nice. See you in the morning, Pete.

PAO This is Apollo Control with that final tuck-in message by Spacecraft Communicator, Jerry Carr. Apparently communications have ceased for the next 10 hours. The spacecraft is now 183 032 nautical miles out from Earth. Velocity 2236 feet per second. Coming up at 68 hours, 30 minutes some 34 minutes from now will be the cross over from Earth sphere of influence to the Moon's sphere of influence. And at 67 hours, 56 minutes ground elapse time this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 69 hours 19 minutes ground elapsed time. Apollo 12 presently 32 099 nautical miles from the Moon, traveling at a velocity relative to the Moon of 3542 feet per second. After the changeover in reference from Earth to Moon, numbers they now display here in Mission Control now show Moon distances, and Moon relative velocities. We have a little over a minute of accumulated tape where spacecraft communicator Jerry Carr discussed with Dick Gordon some minor adjustments to the passive thermal control mode. Also, setting up the communication system for the sleep, and finally what is probably a final conversation for the next 10 hours or so. We'll roll that tape now.

CAPCOM Apollo 12, Houston.

SC Houston, 12. Go ahead.

CAPCOM Roger. You about through with your dump up there?

SC Which dump are you talking about, Jerry?

CAPCOM We're showing 02 flow a little bit high.

It looks like your urine nozzle is open, and you're dumping. What we're ending up with here is -

SC Oh, okay.

CAPCOM PTC is going unstable here. It's beginning to diverge. We might as well stop and start it over and get things squared away so there will be no danger whatsoever of waking you guys up later.

SC Okay. We'll stop the purge now.

CAPCOM Hey Dick. What do you say we reestablish PTC here, and get going good so there will be no danger of waking you later.

SC Okay.

SC Houston, 12. How does the rate look?

CAPCOM 12, Houston. The rates are looking good.

SC Okay, here we go.

CAPCOM 12, Houston. You're clear to go ahead and turn it up and set your S-band on normal mode and switch to OFF.

SC Roger. Goodnight.

CAPCOM Goodnight Dick.

PAO This is Apollo Control. That wraps up communications that took place after the rest period was scheduled to begin. This period extended to 10 hours since the midcourse correction maneuver number 4 is extremely likely not to take place. Meanwhile the Space Flight meteorology group of the weather bureau said this morning that weather conditions in the planned landing areas are expected to be satisfactory for the next 4 days. Ocean areas of concern should have partly cloudy to cloudy skies, winds 10 to 12 knots, seas 3 to 4 feet, temperatures in the Atlantic area in the upper 70's, temperatures in the Pacific area in the mid 80's, isolated showers in the Atlantic and widely scattered showers in the Pacific, and at 69 hours 23 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69 CST 0830 GET 70:08 176/1

PAO This is Apollo Control 70 hours 08 minutes ground elapsed time. Distance now of Apollo 12 from the moon 30 385 nautical miles, velocity toward the moon 3558 feet per second. To summarize the last 8 hours of the Apollo 12 mission, which the green team of flight controllers under Flight Director Cliff Charlesworth are here in the Control Center, the crew of Apollo 12 went into the LM for the LM familiarization and housekeeping chores somewhat early. Also, the television pass, which had been scheduled to start at 63 hours 30 minutes actually began at 62 hours 52 minutes, about 38 minutes early. TV ran 56 minutes total time. During the TV pass the crew of Apollo 12 took the viewers on a tour of the lunar module and how they stowed the equipment in various stowage areas, a description of some of the pilot devices such as the landing point designator, and they closed out with a view of the earth and the moon out the command module windows after the hatch's probe and drogue had been restowed in the tunnel. They continued on with their eat period and the presleep checklist had a negative crew status report. They have taken no medications. They are back on the timeline for the beginning of the rest period at 68 hours and since midcourse correction number 4 likely will not be made, the sleep period will be extended for a total of 10 hours to end some 7 hours 48 minutes from now. Apollo 12 entered the moon's sphere of influence or equigravisphere at 68 hours 30 minutes 22 seconds. Handover is taking place now. The day shift, headed up by Flight Director Jerry Griffin, and here in Mission Control the new team of flight controllers, who likely were asleep at the time of the TV pass, are watching a replay on the large television projection screen and on individual monitors. At 70 hours 11 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11-17-69, 9:40 AM CST, GET 71:18:00 177/1

PAO This is Apollo Control at 71 hours, 18 minutes. Apollo 12 is 27 953 nautical miles from the moon traveling at a velocity of 3 582 feet per second, that is lunar referenced. Total weight of the vehicle, 96 117 pounds. Six hours, 41 minutes remaining in this sleep period. Systems performance on Apollo 12 continues normal. This is Mission Control, Houston at 71 hours, 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/17/69 10:10CST GET 71:48:00 178/1

PAO This is Apollo Control. It's 71 hours 48 minutes. At this time we will replay the tape of the television transmission of early this morning. We'll play the video and audio back to the news center in building 1 at the Manned Spacecraft Center. Go to utilize the release line for the audio portion of this tape. We'll play the tape now. Roll the tape.

Repeat of TV Transmission.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 715900 CST 1021 179/1

REPEAT OF TV TRANSMISSION - REFERENCE PAGES 163.2 to 164.2.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 10:31 AM CST, GET 72:09:00 180/1

REPEAT OF TV TRANSMISSION (CONT'D). REFERENCE PAGES 164.2 to 165.3.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 10:31 AM CST, GET 720900 181/1

REPEAT OF TV TRANSMISSION (CONT'D). REFERENCE PAGES 165.3 to 166.3.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 10:51 AM CST, GET 720900 182/1

REPEAT OF TV TRANSMISSION (CONT'D). REFERENCE PAGES 166.3 to 167.2.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 11:01 AM CST, GET 720900 183/1

REPEAT OF TV TRANSMISSION (CONT'D). REFERENCE PAGES 167.2 to 168.1.

APOLLO 12 MISSION COMMENTARY, 11/17/69, CST 1101 GET 72:39 183/2

PAO This is Apollo Control at 72 hours 44 minutes. All still going well with Apollo 12, 5 hours 15 minutes remaining in the sleep period. Apollo 12 is 24 880 nautical miles from the moon, approaching it at a velocity of 3618 feet per second. This is Mission Control Houston at 72 hours 45 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/17/69 11:40CST GET 73:18:00 184/1

PAO This is Apollo Control it's 73 hours 18 minutes. All still going well with Apollo 12. Four hours and 41 minutes remaining in the sleep period. The only crewmen being monitored at the present time is the command module pilot Dick Gordon. His heart rate is running around 65 which is his normal sleep heart rate, the flight surgeon reports. Apollo 12 is 23 681 nautical miles from the moon, approaching at a velocity of 3 634 feet per second. This is Mission Control, Houston at 73 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69 GET 741800 CST 1240 185/1

PAO This is Apollo Control at 74 hours, 18 minutes. Apollo 12 is 21 544 nautical miles away from the moon. Velocity has increased to 3 666 feet per second. Systems performance still normal. We have 3 hours, 41 minutes remaining before we put in a call to awaken the crew. If they awake on their own before that time, we may expect to hear from them. At 74 hours, 18 minutes, this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69 CST 1340 GET 75:18 186/1

PAO This is Apollo Control at 75 hours 18 minutes. Apollo 12 is 19 371 nautical miles from the moon, velocity 3705 feet per second. All continuing to go well, and we are 2 hours 41 minutes away from crew wakeup time. This is Mission Control Houston at 75 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 761800, CST 1440 187/1

PAO This is Apollo Control at 76 hours 18 minutes. Apollo 12 is approaching the Moon at a velocity of 3751 feet per second, distance from the Moon now, 17 180 nautical miles. We plan to put in a wake up call to the crew 1 hour 41 minutes from this time. This is Mission Control Houston at 76 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69 GET 764600 CST 1508 188/1

PAO This is Apollo Control at 76 hours, 46 minutes. The flight dynamics officer has just informed Flight Director Jerry Griffin that based on his latest update, he confirms positively now that no midcourse correction number 4 will be required. The magnitude of that maneuver is only 2 feet per second. We have been operating for the past number of hours on the assumption that it would not be performed and on that basis, had extended the sleep period 2 hours, shortly after it began. We are now 1 hour, 13 minutes from the wake up period of the extended sleep period; 10 hours instead of 8 hours. The midcourse correction number 4 will be incorporated into the lunar orbit insertion maneuver number 1, and flight dynamics reports that burn will be targeted to produce a lunar orbit, of 62 by 169.3 nautical miles. His latest update shows that the closest approach to the moon without the lunar orbit insertion burn will be 64.73 nautical miles. That would occur at an elapsed time of 83 hours, 28 minutes, 32 seconds, and the velocity at closest approach would be 8239 feet per second. At 76 hours, 48 minutes this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 77:18:00, CST 1540, 189/1

PAO This is Apollo Control at 77 hours 18 minutes. Apollo 12 is 14 967 nautical miles from the Moon. Its velocity, 3811 feet per second. We're 41 minutes away from wake-up time. This is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 77 hours 45 minutes Fourteen minutes remains in this sleep period but we have indications that the crew is awake. Communications officer reports that he can see through telemetry that they have configured their communications equipment for voice transmission, so we may be hearing from the crew prior to the official wake up time. We'll keep this circuit up live for any communication we may get from the crew.

PAO Still no word from the crew and we're 5 minutes away from the time that we'll initiate a call to them. Apollo 12 is 13 615 nautical miles from the Moon, their velocity 3856 feet per second.

Reveille being played.

PAO We don't think the crew heard that because there was an antenna switch right at the start of that bugle call. If we don't hear from them shortly, we're liable to play it again.

CAPCOM One more time.

Reveille being played.

SC Apollo 12, all persons accounted for, sir.

CAPOM Roger, 12.

PAO That was Dick Gordon responding.

SC Houston, 12. Can you give me a ROLL angle to stop PTC to do the rest of that alinement?

CAPCOM Sure will, 12. Standby.

CAPCOM 12, Houston. You can continue to do PTC during the alinement as you have before. If you want stop, go to 270.

SC Well keep doing PTC to save some gas.

CAPCOM Roger.

Boatswain whistle.

PAO And that was "Sweepers Man Your Brooms" on the boatswain pipe that we just played up for the crew.

SC Houston, 12.

CAPCOM Morning, 12. Houston, go ahead.

SC Okay, on the crew status report, the CDR slept 9, the CMP 8, the LMP 8. The TID's CDR 11013, CMP 11013, the LMP 04014. We cycled the fan and we're back in a normal intercom mode.

CAPCOM Roger, 12. We copied. When you cycle the fans, could you do that for 3 minutes this time rather than -

END OF TAPE

SC (Garble)

CAPCOM Roger 12. We copy. When you cycle the fans, could you do that for 3 minutes this time rather than the usual one so we can get a little better hack on the readouts.

SC Okay. We'll go back and do it for 3. We just completed it for 2. We'll go back and do it for 3.

CAPCOM Roger.

SC Houston, 12. Could we start battery charge on batt A now?

CAPCOM That's affirmative 12. Go ahead.

We also have a flight plan update, when you're ready.

SC Okay.

SC Okay. We're ready to copy.

CAPCOM First is, seeing we have no MCC-4, replace the flight plan timeline pages from GET 78 to 82 with the pages you'll find in the back - that's 6-7 to 6-9 and then you'll be picking it up again at page 3-58. At 7800, for no MCC-4, delete stop PTC and continue PTC until 80 plus 50. This is optional. Insert then at 80 plus 50 insert stop PTC and roll 300, and that's the moon view attitude in roll. And at 7945, would you perform a rendezvous radar transponder self test to see if there was any effect on it during launch.

SC Okay. We got 80 50 stop PTC, 7945 rendezvous radar transponder self test and we have the proper pages out of the flight plan.

CAPCOM Roger 12.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM 12, we have your consumables update and some comments on your P23's as well as a alteration to your LOI abort card when you're ready to copy.

SC Okay. Let's have the consumables update and all that stuff, in that order.

CAPCOM Okay 12. The consumables add 78 plus 15, RCS total 79.8 and ALPHA thru DELTA in that order 77.5, 83.4, 77.3, 81.2 and that gives you about 92 below the predicted. H2 total 71.2, 69.9. H2 total 70, I'm sorry that's 02 total 70.9, 72.5.

SC Okay.

CAPCOM And 12, for the P23 no COMM procedures. Dick your first sighting exercise showed excellent performance although the use of two different horizon locators resulted in quite different apparent horizons. The CMC horizon should be updated to 19 kilometers rather than the 24 for the no COMM contingency. Change the eraseable address 1351 from its present value of 27340 to 22434.

APOLLO 12 MISSION COMMENTARY, 11/17/69, CST 1627, GET 78:05 191/2

CAPCOM Your second set of P23s done at about 1530 were excellent. Therefore, use the same locator as in this set. As you expected, the best results are obtained when the star is positioned precisely on the sub-stellar point when you're using only the center two-thirds of the sextant field of view and you center the star on the locator.

CAPCOM 12. Do you have those values for the erasable?

SC Okay. We've got all of them.

SC Say again.

CAPCOM 12. Confirm you have the value for the erasable.

SC Okay Houston. The address was 1351 and change it to 22434. Is that correct?

CAPCOM That's correct.

CAPCOM 12. On the LOI abort card which you have in the checklist F 13-2. Your hybrid trajectory is a little different than nominal; your TLI was slightly off nominal and your curve for the LOI abort is very sensitive to the discrepancy in the TLI.

SC Hold it Houston till you get a good antenna.

CAPCOM Okay.

END OF TAPE

SC Hello, Houston, can you read us?

CAPCOM 12, we read you with a great amount of static in the background. Let's wait until we clear it up before we proceed.

SC Hello, Houston, 12, how do you read?

CAPCOM 12, we read you now. I think the static is dropping off. I'm ready to proceed.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM 12, a reminder. It would help if you turn the uplinks squelch off.

SC Okay. Uplink squelch going off.

CAPCOM Pete, we have a discussion of the LOI abort curve when you are ready. That's in your checklist F 13-2.

SC Hang on a second, Houston. The other DSKY has the torquing angles.

CAPCOM Stand by, Dick. Dick, we have them. Go ahead.

SC Okay, Houston. Give me the page again in the checklist you were talking about.

CAPCOM Okay, Pete, that's your LOI abort curve on F 13-2.

SC Okay. We lost you there. All I heard you say was something about the trajectory and you faded out.

CAPCOM Roger, Pete. There is a change necessitated here because your hybrid trajectory is different than nominal. Your TLI was slightly off nominal and your abort curve is very sensitive to dispersions in the TLI. The curve itself should be lowered slightly and we could give you the coordinates for 4 different points and you will be able to plot that curve yourself. Are you ready to copy?

SC Yep, go ahead.

CAPCOM Okay, the 4 points under LOI DELTA V sub M, 40029012460. The corresponding abort DELTA V's, 22402065 18651800. You copy?

SC Okay. I see we have four points, 400 290 135 and 600 and they correspond to 224020651865 and 1800. Is that correct?

CAPCOM Pete, one correction. On your LOI DELTA VM. Your last one is 60 - that is 60, rather than 600.

SC Okay.

CAPCOM Your CSM gimbal angles which you will see down in the lower right are ROLL 295, PITCH 271, YAW 332.

SC Okay. 295, 271 and 332.

CAPCOM That's correct. When you plot the curve over, you'll see that your crossover point for MODE 1 occurs

CAPCOM at 320, 320 rather than 290 as showing. This will have to be changed in 3 places. First of all, the table which you have on the card, your first range goes from 290 to 650, that would now go from 320 to 650. On your flight plan, the value 290 is found also on Page 3-59. That will have to be changed to 320. Also the LMP Cue card should be changed from 390 to 320. All of the other limits are unchanged.

SC Okay. We've got that.

CAPCOM Okay, Pete, that's it.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 16:52 PM, CST, GET 78:30:00 193/1

PAO This is Apollo Control, at 78 hours, 30 minutes. The change of shift news conference in the Houston News Center will begin at 5:30 PM, Central Standard Time. 5:30 PM for the change of shift news conference.

CAPCOM 12. Houston.

S/C Go ahead.

CAPCOM 12, for your information, after 6830 a little over 10 hours ago you started accelerating back towards the moon and you are now around 12,192 nautical miles out and your velocity is building, you are presently going 3911 feet per second. We have some morning news for you. The news of the flight of Apollo 12 continues to maintain world-wide interest and your television broadcasts are getting priority preference on the local and network newscast. There is a lot of foreign press here here at Houston Press Center and it is expected to intensive as you get closer to the lunar landing. Incidentally, there is a new baby boy born to a Baltimore, Maryland mother at the precise time of your liftoff. Her name - his name is Charles Richard Alan - Wilson is their last name.

S/C (Garble) Nobody is perfect.

CAPCOM We have some sports news and one of the leading item is -

S/C - the first?

CAPCOM Say again.

CAPCOM Say again 12.

S/C What did you say was first?

CAPCOM First name turned out to be Charles. Charles Richard Alan. Al, I guess you just snuck in there. We will be back to you in just a minute with the sports news as soon as we get a better antenna.

S/C Okay.

CAPCOM 12. Houston. We will continue with the sports news when you are squared away.

S/C Okay. Go ahead.

CAPCOM News reports say that Notre Dame may be about to accept a bowl invitation. This would be for the first time since 1925. If he turns out to be the cotton bowl, they will undoubtedly play the winner of the Texas-Arkansas southwest conference championship in Fayette on December 6. Notre Dame has a 7-1-1 record losing only to Purdue at the beginning of its season. Bobby Roseburg took an early lead and held on Sunday to defeat Jimmy Wright by one stroke in the \$50,000 TGA club championship at the Road Runner Golf resort in Scotsdale. Results of yesterdays ball games - first in the National League - Los Angeles took philadelphia 23 to 17. It was Dallas over Washington - 42 to 28.

APOLLO 12 MISSION COMMENTARY, 11/17/69, 16:52 PM, CST, GET 78:30:00 193/2

Minnesota - 9 -- Green Bay - 7. Cleveland was over Pittsburg - 24 to 3. San Francisco - 20 and Baltimore - 17. IN a close one - New Orleans - 25, New York 24. Atlanta took Chicago 48 to 31 and Detroit over St Louis - 20 to 0. In the American League - Kansas City 34 and New York 16. Okland - 21 and San Diego 16, Buffalo over Miami 28 to 3. Boston took Cincinnati 25 to 14. Houston and Denver played to a 20-20 tie. However, in the - Houston really made classic comeback in the last 11 minutes. They put 17 points on when they were down 3 to 20 inside of 11 minutes. First of all, right tackle Domres scampered into the end zone after picking up a fumble and running 35 yards. Beathard then got one long bomb to Jerry Levias which was over 80 yards and at the last 3 seconds left, Gerela kicked one field goal. Pete Beathard looked pretty good, especially in the last quarter and especially on that one last long bomb. He laid it right in the hands of Levias. And Pete, one last item - Al Unser won the Phoenix 200 race.

S/C Roger. Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 78:47:00, CST 17:09, 194/1

SC - Thank you.

PAO Apollo 12's present distance from the Moon at 78 hours 48 minutes is 11 546 nautical miles. Velocity, 3940 feet per second. Flight director, Glynn Lunney and his black team is in the process of taking over from flight director, Jerry Griffin and the gold team. The Cap Com on the oncoming shift will be Astronaut Paul Weitz.

PAO This is Apollo Control at the present time, the crew is scheduled to be eating breakfast. We don't anticipate a great deal of conversation from them. The change of shift press conference is scheduled to begin shortly in the Houston news center. We will be taping any conversation from Mission Control to the crew during the press conference, playing it back immediately following. At 79 hours 2 minutes into the flight, Apollo 12 is at an altitude of 11 058 nautical miles from the Moon, travelling at a speed of 3964 feet per second. This is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 79 hours 25 minutes. During the Change of Shift Briefing we had one brief conversation with the spacecraft. Commander Pete Conrad came on to describe the Moon for us. The spacecraft, at the present time, is about 10 113 nautical miles from the Moon traveling at a speed of 4015 feet per second. We'll play back that tape for you and then continue to stand by live.

CAPCOM Hello 12, Houston. We have a state vector and a clock update for you if you'll give us POO and ACCEPT please.

SC Roger, Roger. POO and ACCEPT.

SC Boy, that bird looks big today Houston. It's about the size of a baseball held at arm's length. And you can see all the mountains, the craters. It's really a beautiful sight. We're starting to move on the far side of the sun from it so we only see about an eighth of it. But that eighth of it is really stark. You can see particularly up near the poles - on the LM you can start to see that. It is not a nice smooth ball anymore. It's got some of - sort of ridges, bumps, that would be mountains or craters if you could see them like head on. It's a beautiful sight.

CAPCOM Rog. Understand 12.

CAPCOM That's a good sign if it's getting to be look bigger.

SC On the other hand, the earth - on the other hand, the earth looks like about the size of a quarter held at arm's length, which is pretty small.

CAPCOM Rog.

CAPCOM 12, Houston. We're waiting to get high bit rate before we send up that load - the reason for the delay.

SC Okay.

CAPCOM 12, Houston. Computer yours.

SC Roger.

SC Houston, 12.

CAPCOM Go 12.

SC Roger. You want to watch this rendezvous radar transponder self test? We're about ready to do that any time you are.

CAPCOM Please stand by.

CAPCOM 12, Houston. There's nothing meaningful we can monitor on that, Pete. Just go ahead with it.

SC Okay. 10 - 4.

SC Houston, 12.

CAPCOM Go 12.

SC Best we could determine, it's a good transponder. System test in A gave us 4.2, system test B gave us 2.0. With it in OPERATE on D it gave us 0 and system test indicator in C UNLOCK gave us 0.4.

CAPCOM Roger. Copy 12. Understand. Thank you.

SC Anything else you need?

CAPCOM If you're finished eating, I've got a pericynthion plus 2 abort pad for you.

SC Okay. Al is ready to copy.

CAPCOM Okay. Pericynthion plus 2. SPS G&N. 62491 plus 090 minus 017 085 25 1792 plus 16010 plus 15619 minus 34981. The roll angle is NA is unconstrained. The Pitch angle is 031. The remainder of the pad is NA. And there is no ullage and of course it will be a docked burn. Over.

SC Okay, Houston. That's pericynthion plus 2. SPS G&N 62491 plus 090 minus 017 085 25 1792 plus 16010 plus 15619 minus 34981. NA 031. The rest of the pad is NA. No ullage. Dock burn.

CAPCOM That's for Charlie, Al.

END OF TAPE

CAPCOM Apollo 12, Houston. I have some checklist changes and updates for you if you want to break out your LM contingency checklist and the LM timeline book, please.

SC Okay. Be with you in just a second. They are buried up here in I-3. We're going after them.

CAPCOM Okay.

SC Okay. I've got the timeline out. Let's go over those changes first, please.

CAPCOM Okay. On the LM timeline book, Page 6.

SC Okay. Go ahead.

CAPCOM Okay. Touchdown plus 3 to through T-2 abort. There's a top left-hand part on about the 8th or 9th step down, there's descent vent fire. Got that?

SC Yes.

CAPCOM Okay. Insert after that, if the she pressure drops 15 psi, then close both vents.

SC We got it.

CAPCOM Okay. Spence said he briefed you on, before launch, then we vent the oxidizer per the checklist and vent the fuel at 8 psi.

SC Roger. We got them.

CAPCOM Okay. Now we go to the contingency book.

SC We don't have that book aboard. It's in the LM right now, but we'll take a note on the flight plan and move it over there.

CAPCOM Okay. Page Delta/Alpha 6 Step 1. After the step which says Guidance Control to PTCA, add - on the commander's PTCA throttle min. The reason for that is if the engine is on longer than 2 minutes, as it may be when you run through the rest of this check, if it is on longer than 2 minutes without the PTCA, and throttle at 10 percent, you may damage the throttle actuator.

SC I understand.

CAPCOM Okay. On Page DA7, after Step 1, we want you to set the lunar centered bit. You do that with a VERB 25, NOUN 07, enter, 104, enter, 06000, enter, 1, enter. Over.

SC Roger. That's VERB 25, NOUN 07, enter, 104, enter, 06000, enter, 1, enter.

CAPCOM That's affirm, Al.

SC That's interesting that we have to set it then and we never have to set it during normal operations.

CAPCOM Okay. Let me see if I can get an answer for you on that.

SC Also, the first one you sent up we made the change in our activation checklist, correction, lunar

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 794200, CST 1804 196/2

SC surface checklist first page to reflect also
the new vent pressures.
CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/17/69 CST 18:14 GET 79:52 197/1

CAPCOM Hello 12, Houston. The reason for this, Al,
is that in the normal activation sequence, that setting, the
lunar centered bit that you asked about, in the normal acti-
vation sequence, the ground uplinks the VECTOR and in the
other stuff that they send up with that VECTOR, they sent
this lunar centered bit. However, the page we're talking
about is the contingency for a dock dips burn, that VECTOR
is not sent up and you will have to set this bit on board.

SC Roger, understand now.

PAO This is Apollo Control at 80 hours 3 minutes.
Apollo 12 is 8642 nautical miles from the Moon. Traveling
at a speed of 4114 feet per second. The data transmitted
to the ground from the Apollo 12 crew following the rendezvous
radar transponder soft test indicated that there is no prob-
lem with that piece of equipment on the command module. The
crew at the present time is running through some of the Lunar
Orbit Insertion checklists and checks for the maneuver,
scheduled to occur at some 83 hours 25 minutes into the mis-
sion. We have a TV transmission scheduled at 81 hours 30 min-
utes which will be about 7:52 p.m. central standard time.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 18:34 CST, GET 80:12:00 198/1

S/C Houston, Apollo 12.

CAPCOM Go ahead, 12.

S/C Roger. LIOH cannister change no. 7 is complete and we are getting ready to pressurize the CSM and then the LM.

CAPCOM Roger. Understand and you verify the position the oxidizer flow valve for me please.

S/C Full increase.

CAPCOM Thank you.

S/C It's at full increase right now and it shows MAX in the window. It was at normal when we started the burn for the midcourse and the minute it started, I moved it to increase and it finally made MAX by the time we shut down. So we are planning to burn at full increase.

CAPCOM Okay. Thank you Al.

S/C Boy, the moon is still getting big out there, Houston. It's about the size of a large grapefruit when you hold it about half-arms length. It's a monster.

CAPCOM Yeah, that's a good sign, Al, and Pete wanted a reminder on breaking out the monoculars if you are getting in close to the moon there.

S/C Okay. We have been using it pretty regularly. We didn't know we were going to use it so much translunar, but it turned out to be pretty good even at great distances and using it up close like this, the features are very, very, stark and I never really realized how high the edges of these craters are. These large craters are steep and it is pretty rough looking sunlight.

CAPCOM Roger. Understand.

S/C Say again, Houston.

CAPCOM Just rogered for your transmission.

S/C Houston, Apollo 12. The LM is pressurized.

CAPCOM Roger, 12.

PAO This is Apollo Control. That was Al Bean giving us the report on the moon. Commander Pete Conrad reporting the LM pressurized.

CAPCOM Roger, 12.

S/C Houston. We are going to do our pre LOI secondary ECS loop check right now.

CAPCOM Roger, 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 802200, CST 1844 199/1

SC Houston, 12.
CAPCOM GO, 12.
SC Roger. Secondary loop looks okay to us. glycol EVAP, temperatures coming down and the quantity dropped just a little bit with the temperature coming down and also the radiator's being filled up with that stuff for the first time. What do you think? It looks pretty stable to us right now.
CAPCOM Roger. It looks good here on the ground, Dick.
SC Dropped to a quantity of about -
SC Yes. Dropped to an indicated quantity of about -
SC We are going to go ahead and secure it.
CAPCOM Roger.
SC The moon is about the size of a volleyball now at arm's length.
CAPCOM Roger. You guys must really be closing in on it, eh?
SC This is the first time we have been able to look at it and in the Mare area. Up to now, it looked very, very smooth, but now when you look at the Mare area, you can see there's a quite a number of long ridges and what have you that mar the maria a little bit.
CAPCOM Roger.
CAPCOM 12, Houston. You can terminate charge on Bat A.
SC Roger. Terminate the charge on Bat A.
SC We getting closer to the moon fast enough now that everytime we do a 360 you pick it back up in the windows again. You can see it grow quite considerably.
CAPCOM Roger, 12.
PAO This is Apollo Control at 80 hours 32 minutes. Flight Director Glynn Lunney has just gone around the room getting a status from all of the flight controllers for lunar orbit insertion 1. Our report from each is that we are on the flight plan. Everything normal. Apollo 12 is presently 7488 nautical miles from the moon, as we continue to see a rapid decrease in the altitude and a correspondingly rapid increase in the velocity. In the next 3 hours prior to lunar orbit insertion, the velocity will just about double, going from the current 4213 feet per second to something on the order of 8000 feet per second.
SC Okay, Houston, The next trip passed 300 we'll go ahead and stop PTC. We're just out of about 50 degrees roll now coming around and we'll stop PTC at

APOLLO 12 MISSION COMMENTARY, 11/17/69, GET 802200, CST 1844 199/2

SC 300.
CAPCOM Roger, 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/17/69, CST 1904, GET 80:42 200/1

CAPCOM Hello Apollo 12, Houston. If you'll give us POO and ACCEPT, we'll send up your target load and your REFSMMAT and your last state vector is still good. We will not be sending up a new state vector.

SC Okay. You've got it. POO and ACCEPT.

SC Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC Hey, another interesting thing is you look out on the mare, it looks so, so much from the maps that I seen of earth from the photos, there's isolated large mountains - hills, or something right scattered throughout the mare. And it is low sun angle that we've got on the Moon right now which is about a little less than an eighth, maybe a tenth of the moon. They almost look like cumulus clouds at first glance because they're very bright on top and they're significantly higher than the mare. And when you look at it closer in the monocular you can see that they're just very high hills.

CAPCOM Buzz us 12 when it's there.

CAPCOM Hello 12, Houston. If you use your - -

SC (garble)

CAPCOM Say again what you worked on Pete.

SC Nevery mind.

CAPCOM Ow Roger, I understand. Yeah.

CAPCOM He started a little earlier this time.

SC Leave it alone.

SC He won't let either one of us look.

CAPCOM Jack Schmitt's here. He wants to know how Al spells mare.

CAPCOM It's a pop quiz.

SC Is that that geology pop quiz you were going to give us the other day?

CAPCOM That's the first question. (Laughter).

SC He refuses to take it. He won't take it for me.

CAPCOM Okay. If Al wants to do something worthwhile, I've got a pass for him.

SC Thank you Al, now we can look.

SC Go.

CAPCOM Okay. LOI 1 SBS G&N 62491 plus 090 minus 017 083 25 1851 minus 28213 plus 06036 plus 01124 002 263 018 HA and HP are NA 2887355828804 sextant star is 02 25 40 380. The rest of the pad is NA. Your DDC stars are Sirius 15 that's your z-axis star and Rigel 12. The angles are 134 230 and 357. The LM weight is 33 585. Over.

SC LOI 1 SBS G&N 62491 plus 090 minus 017 083 25 1851 minus 28213 plus 06036 plus 01124 002 263 018 NA NA

APOLLO 12 MISSION COMMENTARY 11/17/69, CST 1904, GET 80:42 200/2

SC 28 87 3 558 28 804 02 2540 380. Sirius 15 is the Z-axis star Rigel 12 124 230 357 and the LM is 33 585.

CAPCOM That's affirmative Al and if you'll get out two more pads I've got TEI-1 and 4 for you.

SC Go ahead. Ready to copy.

CAPCOM TEI-1, SBS G&N - -

END OF TAPE

S/C Go ahead. Ready to copy.
CAPCOM PI 1 - SPS G&N 38641 minus 059 plus 064
085323916 plus 32071 plus 08130 minus 03109. N/A for ROLL.
PITCH is 093. The rest of the pad is N/A. Your ullage
is four jet for 11 seconds, burn undocked. Over.

S/C Okay Houston. PI 1 - SPS G&N 38641 minus 059
plus 064 085323916 plus 32071 plus 08130 minus 03109 N/A
093. The rest is N/A. Ullage is four jets for 11 seconds,
burn undocked.

CAPCOM That's affirmative, and you are ready for
TI four.

S/C Go.
CAPCOM Okay. This is also SPS G&N. N/A. N/A.
N/A down to time. The time 092004670 plus 35196 plus
09672 minus 01774 N/A 084. The remainder is N/A. Same
ullage. Undocked, assumes no LOI 2.

S/C Roger. SPS G&N again. N/A. N/A. N/A.
092004670 plus 35196 plus 09672 minus 01774 N/A 084 N/A
Rest - N/A. Ullage the same as previous. Undocked and
assumes no LOI 2.

CAPCOM That's affirmative.

S/C Hello Houston. Apollo 12.

CAPCOM Go, Dick.

S/C We're set up in the attitude for looking at
the moon. We can see it pretty good. We're worried about
the sun angle on it for television. We'll take a look at it
and while we are doing that, I'll go ahead and do the landing
site and REFSMAT orientation. Okay.

CAPCOM That will be fine and if you are getting
sunlight in the camera, about the only thing that's expected
for it to help is point as far away from the sun as you can
towards the points of the crescent.

S/C That's not our problem. The problem is -
the sun is shining on the center hatch window and the hatch
window has so much gunk on it that it is just so shiny that
I am afraid the TV wouldn't look through it. The sun is not
directly in the window yet but we'll look at it - we can
close it - of course, we are going to drop behind anyhow
and eclipse the sun there in a minute.

CAPCOM Roger.

END OF TAPE

CAPCOM 12, Houston. You might consider if that hatch window is really clobbered, Pete, looking out one of the side windows. We've got some angles here if you want to use window number 1 and we can work something up for window number 5 if that's a better window.

SC Five is absolutely the best window. It's the only one we're ever going to get any pictures out of. The rest of them are so clobbered that we're not going to get much out of any of them.

CAPCOM Okay, we'll have to run that through and check and make sure.

SC We need an angle for window 5.

CAPCOM Okay, we'll have to run it through and make sure we can get high gain and the window at the Moon.

SC Okay, Houston, you're looking at our (garbled) angle.

CAPCOM We have it, 12.

SC Okay.

PAO This is Apollo Control at 81 hours 10 minutes. We're now about 20 minutes from the start of the scheduled TV transmission from the spacecraft as Apollo 12 nears the Moon. The spacecraft presently some 5900 nautical miles from the Moon, traveling at a speed of 4391 feet per second.

SC Houston, 12. Shall we give you the high gain now?

CAPCOM That's affirmative.

CAPCOM Hello 12, Houston. Looking out window number 5, Pete, does not give us satisfactory high gain angle. So looks like we got our choice of a hatch window or window number 1. Also on previous flights it is indicated that even though the windows looked pretty grungy to the people on board, with the TV camera focused set at infinity, you kind of look through some of that stuff on the window and it's not as bad to us as it is to you.

SC Okay. Let us give it a try here for a minute out this center window and see what happens.

CAPCOM Okay, now if you'd rather use window number 1, we've got some angles for you or you can go ahead and use the hatch window.

SC I think we're better off with the center window in this case and we'll give her a try here and let's see what happens.

CAPCOM Roger.

END OF TAPE

SC I think that we're better off with the center window in this case. We'll give it a try here and we'll see what happens.

CAPCOM Roger.

SC We're not going to send you any T.V. We're just going to experiment with it for awhile in here and see what we get.

CAPCOM Understand.

SC If it doesn't turn out right, we'd just as soon not send it.

CAPCOM Okay.

CAPCOM 12, Houston. To minimize perturbation to your trajectory now, we're requesting that you go out of single jet attitude control vector couples. Over.

SC Roger. It worked.

SC Houston, 12.

CAPCOM Go ahead, 12.

SC All the T.V. is doing is an excellent job of picking up all the droplets and glare and rivulets on the window. It's pretty hopeless.

CAPCOM Okay. One suggestion is to try to fake it out a little bit, by putting your ALC switch to the inside position and see if that makes any difference.

SC Okay. We tried both.

CAPCOM Roger.

SC Houston, how long are you going to have Goldstone? It could be that when we slip behind the Moon - the Sun gets behind here - we may be able to give you some then.

CAPCOM Okay. Standby.

CAPCOM 12, Houston. We can - we have Goldstone scheduled for 20 minutes. We can keep it for as long as you need it.

SC Okay, Houston. Why don't you hold on to him for a little while, and we'll see if we can pick anything else up out the window for you.

CAPCOM Okay. Thank you.

SC Roger. It looks like it's about 10 or 15 degrees between the lighted end of the Moon and the Sun right now and it's just making our glass glare so much, there's no possibility of showing you what we see. We have to sort of get over near the edge where we can block the Sun with the window frame before we can see it ourself. Maybe when we go behind it, we can open up the aperture and you can see some Earth shadow. I don't know if that's possible or not.

CAPCOM Okay. The solar color corona will probably look great if you can get that coming by. That's supposed

CAPCOM - to be a pretty good camera for picking that up.

SC We'll give it a go.

CAPCOM Okay. Pick up a few credits in electives there.

SC Yes, if that's okay. If you're going to do that, you'd better do something about those maneuvers for 81 55.

CAPCOM Okay.

CAPCOM Hello, 12, Houston. We're going to keep Goldstone standing by but as far as going through burn attitude 8155 we'll do that and we'll press on with the flight plan as advertised.

SC Roger, roger, we concur.

SC It's a shame that we don't have a shade of some kind that we could shade that window with cause this is really quite a site. Our motion to the left is not as apparent as our motions towards the Moon and therefore we have the decided impression that we're going right into the center of that baby right now.

CAPCOM Okay, we'll check it out for you.

SC Naw, that's okay, I trust you.

PAO This is Apollo Control at 81 hours 29 minutes. We'd like to resummarize at this point what we know about the television transmission scheduled to begin at 81 hours 30 minutes. Pete Conrad advised that the sun glare through the window, which is apparently the only window available to us for getting a shot of the lunar surface, with the high gain antenna at the same time pointing toward Earth, is not acceptable. Apparently would not give us a usable picture of the lunar surface from the spacecraft because of sun glare. We intend to stick with the flight plan as far as maneuvering the spacecraft to the burn attitude, the attitude for the LOI insertion burn. Now that maneuver to attitude is scheduled to occur at 81 hours 55 minutes. And going to the burn attitude, the windows would not be in a position also for a television picture of the lunar surface. We do not at this time, I don't know whether the crew intends to transmit a picture from inside the spacecraft and we'll continue to standby.

SC Houston, 12. It's really a shame we can't show you this sight because we're dropping behind it in a hurry with respect to the sun and we've only got about two degrees of a crescent Moon right now and the rest of it, of course, is all in black, but we're dropping behind it fast enough that we can just sit over a few minutes period of time you can see it get smaller and smaller the illuminated portion. Also, of course, it's filling more and more of the window all the time cause we're - we're really spoking in there.

CAPCOM Roger, 12.

PAO This is Apollo Control based on that last comment from Pete Conrad, we do not expect a television transmission from the spacecraft as scheduled at this time. To recap, Conrad advised that the sun glare through the window with the deposits on the window had made a usable television picture impossible. There was some thought to waiting until the spacecraft passed into the shadow of the Moon at which the time the window would be shielded from the glare and possibly get a picture of the Solar Corona however, this would interfere with the maneuver to the burn attitudes scheduled at 81 hours 55 minutes. We do not expect a television

PAO transmission. At the present time, Apollo 12 is 4886 nautical miles from the lunar surface traveling at a speed of 4559 feet per second. This is Apollo Control at 81 hours 49 minutes continuing to standby.

S/C Houston, Apollo 12.
CAPCOM Go ahead, 12.
S/C Could you give us your estimation of the fuel quantity and the helium pressure, SPS helium pressure, after the burn is complete. Your latest guess.
CAPCOM Will do. Standby.
S/C Okay, Houston. We are maneuvering to the burn attitude.

CAPCOM Roger. We copied that 12.
CAPCOM Hello 12, Houston. After the burn, Al, your fuel quantity should show 39 percent remaining, your SPS helium pressure should be 1500 psi.

S/C Houston, thank you.

PAO This is Apollo Control at 81 hours, 53 minutes. The spacecraft now traveling at a speed of 4726 feet per second and about 4000 nautical miles from the lunar surface. We have the preliminary figures on the lunar orbit insertion maneuver, the first of two maneuvers to place the spacecraft in a more or less circular orbit about the moon. The ignition for LOI 1 ignition time will be 83 hours, 25 minutes, 19 seconds. A burn duration will be 5 minutes, 58 seconds, and we'll subtract about 2880 feet per second from the spacecraft velocity with that maneuver. In performing that 5 minute, 58 second burn, the service propulsion system engine will consume about 33 500 pounds of propellant or about 60 percent - 61 percent of the propellant carried. The spacecraft currently weighs 96 076 pounds. We estimate after the lunar orbit insertion maneuver, the weight will be about 62 491 pounds - the difference in weight, of course, being accounted for in the propellant consumed in the burn. The television transmission scheduled at 81 hours, 30 minutes, was scrubbed after the crew reported the center hatch window which they had intended to use for transmitting the picture of the lunar surface was not useable due to a combination of deposits on the window and very bright sun glare. Pete Conrad reported at the time that the number 5 window, which is the window adjacent to the lunar module pilot's couch, to the right of the cockpit, was quite a bit better and would have been useable. However, it was not possible to point the number 5 window at the lunar surface and at the same time point the high gain antenna, which is needed to transmit the television signal back to earth - in the direction of earth - and it was therefore necessary to scrub the television transmission. We do not expect that the glare on the window will be a significant problem for the television transmission scheduled at 84 hours. At this

PAO time the spacecraft would be pointed at the lunar surface and the glare from the sun should be greatly reduced. The Apollo 12 crew advised a short while ago that they were maneuvering to the burn attitude. They will continue making checks of all of their spacecraft's systems prior to the maneuver. That will be consuming the majority of their time between now and ignition for lunar orbit insertion, which is scheduled to occur at 83 hours, 25 minutes, 19 seconds. At 81 hours, 56 minutes, this is Apollo Control.

END OF TAPE

CAPCOM Apollo 12, Houston. If you'll give us
POO and ACCEPT we'll send up your state vector and target
load.

SC Right sir.

CAPCOM Got a map update for you.

SC POO and ACCEPT.

SC Go.

CAPCOM Day map update date for Rev 1. 83 11 46
83 24 35 83 43 57 83 36 36. Over.

SC Roger. Under 83, you want 1146 83 2435
83 4357 83 3636.

CAPCOM That's affirmative.

SC Houston, Apollo 12.

CAPCOM Go 12.

SC Roger. The pre LOI 1 systems checks are
complete.

CAPCOM Roger. Thank you 12.

CAPCOM Hello 12, Houston. I have update for your
LOI 1 pad.

SC Okay. Wait 1.

SC Go ahead, Houston.

CAPCOM All right. A1 - now the seconds for your
burn time will change. It is now 22 68. Your NOUN 81
your DELTA VY is now plus 06 070. DELTA VZ is now plus
01 420 dropping down to DELTA VP. That value is now
28 893. DELTA VC is 28 824. Remainder of the pad is
unchanged.

SC Okay. NOUN 33, the seconds register should
be 2268 NOUN 81 DELTA VY plus 06070 DELTA VZ plus 01420
DELTA VP 28893 DELTA VC 28824.

CAPCOM That's affirmative 12.

CAPCOM 12, Houston. The computer is yours.

SC Roger, Houston.

PAO This is Apollo Control at 82 hours 19 minutes.
Apollo 12 now 2914 nautical miles from the Moon. A velocity
up to 5078 feet per second. We just passed up to the crew
some updates to the information they'll need to perform
the lunar orbit insertion No. 1 maneuver. The ignition
time has been changed slightly and the new ignition time
is 83 hours 25 minutes 23 seconds. They've also made a
slight upward increase in the total DELTA-V to be gained
from the maneuver - increase in the DELTA-V by about 2 feet
per second. The current figure is 2889.3 feet per second.
We also have a correction to a figure we gave you earlier
on the amount of propellant to be consumed in that maneuver

PAO - The previous figure given was about 33 500 pounds of propellant. This is incorrect. The figure should have been 23 700 pounds of propellant. A service propulsion system engine consumes propellant at the rate of about 66.4 pounds per second. The burn duration is about 358 seconds. The crew advised that they had completed the pre-LOI-1 systems checks and they reported that at about 82 hours, 14 minutes which would mean that they're running about 30 minutes ahead of the flight plan and getting ready for that burn. Here in Mission Control it has been rather quiet up to this time. Flight Controllers are checking and rechecking the burn figures. The room is now starting to fill up. Now we're getting additional people here in the back row of consoles. Chris Kraft, George Low and Jim McDivitt are now in the Control Center. Also at the CAPCOM console we see Director of Flight Crew Operations, Deke Slayton, as well as astronaut Dave Scott and Jim Irwin. Roco Petrone, Director of the Apollo Program is also here in Mission Control as we continue to prepare for this lunar orbit insertion maneuver. At 82 hours 22 minutes, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control at 82 hours, 37 minutes. One of the clocks on our front display board here at Mission Control shows that we have 34 minutes, 38 seconds until loss of signal as the spacecraft goes behind the moon at prior to the lunar orbit insertion maneuver. That maneuver is scheduled to be performed in 47 minutes, 56 seconds. LOI-1 ignition time is 83 hours, 25 minutes, 23 seconds. The burn duration is currently planned for 5 minutes, 58 seconds reducing the spacecraft velocity by 2,889 feet per second. The spacecraft weight combined CSM-LM weight prior to the burn will be 96 076 pounds. Following the burn we estimate the weight will be 72 225 pounds. The lunar orbit insertion 1 maneuver is targeted for 62 by 169.3 nautical mile orbit. Lunar orbit insertion No. 2 is targeted for a 54 by 66 nautical mile orbit. That burn is scheduled to occur at 87 hours, 48 minutes, 33 seconds with a total DELTA V of 161.6 feet per second. Apollo 12 is now nearing the 2000 nautical mile mark altitude above the lunar surface. That altitude continuing to decrease ever more rapidly and the velocity building up at an increasing rate, now reading 5511 feet or 5511 feet per second. Flight Director Glynn Lunney is periodically going around the room checking on status for the maneuver. A short while ago he advised flight controllers that we are moving along well according to the flight plan and have completed all scheduled activities listed by the flight plan at this time in preparation for the maneuver. The next scheduled activities on the flight plan are rolling to burn attitude verifying the burn attitude with a star check through the spacecraft sextant and aligning the gyro display coupler to the inertial measurement unit. At 82 hours, 40 minutes this is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/17/69,GET 82:41:00,CST 21:03,208/1

SC Houston, 12. We're beginning to go into
darkness at this time.
CAPCOM Roger, 12.
SC In fact, we're there.
CAPCOM Roger.
SC Hello, Houston. P40 is up. How's it look?
CAPCOM We're checking now, Dick.
SC Okay.
CAPCOM Apollo 12, Houston. Looks real good.
SC Okay, if you're happy, we'll go ahead and
roll to 2 degrees.

roll to 2 degrees.
CAPCOM Okay. Go ahead.
SC Houston, we are going OMNI B.
CAPCOM Roger. Pal.
PAO This is Apollo Control at 82 hours 54
minutes. We're now 18 minutes from loss of signal as the
spacecraft goes behind the Moon. The loss of signal is
scheduled to occur at 83 hours 11 minutes 46 seconds. If
the burn is performed as scheduled, we'll reacquire this
signal at 83 hours 43 minutes 57 seconds. Without the
lunar orbit insertion burn, we would acquire the spacecraft
at 83 hours 36 minutes 36 seconds. Apollo 12 now 1297
nautical miles from the Moon's surface. Velocity is up
to 6050 feet per second. A short while ago, the crew
placed their spacecraft computer in the proper program for
performing the service propulsion system burn to put them
into lunar orbit. All that remains at this point is to
roll into the final burn attitude, to check that attitude
by sighting on a star through the spacecraft sextant.
We're now 17 minutes to loss of signal. Our guidance
officer has just advised that the spacecraft is in the
proper burn attitude.

SC Houston, 12.
CAPCOM Go, 12.
SC Roger. Sextant star check okay.
CAPCOM Roger. Thank you.
CAPCOM Apollo 12, Houston. You're go for LOI.
SC Roger, Houston. Go for LOI. The burn
check list is complete. It's minus 6 seconds, and we're
holding at that point.
CAPCOM Roger. Okay, Pete. We'll see you at
43:57.

SC Roger.
PAO We're coming up on 8 minutes now until
loss of signal. Our displays show the spacecraft at an
altitude of 848 nautical miles from the Moon. Velocity,
6550 feet per second. Flight Director Glen Lunney having
just completed going around the room for the GO-NO GO
decision, and as indicated by the word passed up to the

APOLLO 12 MISSION COMMENTARY,11/17/69,GET 82:41:00,CST 21:03,208/2

PAO - crew by Cap Com, Paul Weitz, we are GO
for lunar orbit insertion.

END OF TAPE

PAO This is Apollo Control 83 hours 8 minutes. We're coming up now on 3 minutes 50 seconds until loss of signal as Apollo 12 goes behind the Moon in preparation for inserting the spacecraft into lunar orbit. We'll continue to standby for any parting remarks from the crew before we lose contact with them. We should be out of contact for about 32 minutes 11 seconds. Assuming the burn is performed as scheduled. Without performing the lunar orbit insertion maneuver, we would reacquire the spacecraft about 24 minutes 50 seconds after loss of signal. And the spacecraft without performing that maneuver would pass within about 65 miles of the Moon's surface, at it's closest point. We're now 3 minutes 6 seconds from loss of signal. Apollo 12 624 nautical miles from the Moon's surface traveling at 6900 feet per second.

CAPCOM Hello 12, Houston. Two minutes to LOS, be seeing you shortly.

SC Roger, Houston.

PAO We're coming up now on 36 seconds until loss of signal. All flight controllers here in Mission Control getting one last look at their data before the spacecraft goes behind the Moon. All systems looking very good, prior to this Lunar Orbit Insertion maneuver. And our network controller reports we have loss of signal right on schedule. We should reacquire Apollo 12 in about 32 minutes. Without the burn, the reacquisition time would be 24 minutes 40 seconds from now. At last look, just before we lost data, the spacecraft was at an altitude of 471 point 9 nautical miles velocity at 7188 feet per second. At 83 hours 13 minutes into the flight of Apollo 12, this is Mission Control Houston.

END OF TAPE

GOLDSTONE Goldstone net 1.
MCC Roger, Goldstone.
HONEYSUCKLE Honeysuckle net 1.
MCC Roger, Honeysuckle.
MCC Repeat COM TECH, testing 1 2 3 4 5 4 3
2 1. 12345, 54321.
GOLDSTONE Goldstone, Houston.
GOLDSTONE 100 percent clear, modulating for the go.
MCC Roger.
MCC Honeysuckle, Houston.
HONEYSUCKLE 100 percent clear.
MCC Roger Goldstone. You are active.
Honeysuckle is the backup and the spacecraft will come around in normal voice.
GOLDSTONE Goldstone, Roger.
HONEYSUCKLE Honeysuckle, Roger.
MCC And the VOGAA's are bypassed.
GOLDSTONE Goldstone VOGAA's bypassed.
HONEYSUCKLE Honeysuckle VOGAA's bypassed.
MCC Roger.

END OF TAPE

PAO This is Apollo Control at 83 hours, 36 minutes. We are now less than 1 minute at the earliest time at which we could reacquire Apollo 12. That would be the time of acquisition assuming the lunar orbit insertion maneuver had not been performed as scheduled. We'll continue to leave the circuits up for the intervening 7 minutes during which we could reacquire the spacecraft. Acquisition is scheduled to occur assuming a normal burn in 7 hours, 7 minutes, 30 seconds from now.

PAO This is Apollo Control at 83 hours, 43 minutes. We are coming up now on 1 minute until reacquiring Apollo 12. At time of acquisition the spacecraft should be in an orbit of 62 by 169.3 nautical miles. We are now 45 seconds from reacquisition. The lunar orbit insertion, a 5 minute, 58 second burn of the spacecraft service propulsion system engine. The total velocity reduction from that maneuver is targeted for 2889 feet per second. We now show 15 seconds until acquisition. We'll stand by for first communication from the spacecraft. Our network controller reports that we have acquisition of signal at this time.

CAPCOM Apollo 12, Houston.

SC Hello, Houston, Yankee Clipper with Intripid in tow has arrived on time. Are you ready for the burn status report.

CAPCOM That's affirmative. Go ahead, Clipper.

SC Okay. The burn was on time. The burn time was 5 plus 52. The residuals were minus .1, plus .1, plus .1, DELTA VC was plus 1.0, the fuel 38.4, the oxidizer 38.7, the unbalance was increase 80 pounds. Over.

CAPCOM Roger, 12. Copy.

SC The computer says we are in a 170 by 61.8.

CAPCOM Roger, 12.

SC I guess like everybody else that just arrived, we are all three of us plastered to the windows looking.

CAPCOM Roger. Understand.

SC Yes, but for the Navy troops, it doesn't look like a very good place to pull liberty, though.

CAPCOM Okay. We give you an okay three wire on that one.

SC Very good. I hope we can say the same thing tomorrow.

SC Save those for tomorrow.

PAO Pete Conrad's postburn report indicates the maneuver was almost precisely as planned. The residuals which are an indication of burn error were minus .1, plus .1 and plus .1, which indicates the burn was nearly perfect.

PAO The onboard indication as you heard is that the orbit was 170 by 61.8. We're working on a confirmation of that orbit here in Mission Control at this time.

APOLLO 12 MISSION COMMENTARY, 11/17/69, 22:10 CST, GET 83:48:00 212/1

S/C Hey, Houston. Apollo 12.

CAPCOM Go 12.

S/C That was an excellent long range rifle shot
you guys gave us.

CAPCOM Understand. Will pass it on.

PAO This is Apollo Control. Our displays here in Mission Control now show the spacecraft in an orbit 62.7 by 163.8 which compares very closely with the figures Pete Conrad read from the onboard computer. We also have on the front display board now for the first time during the mission, the large plot board showing the spacecraft orbit around the moon. We are currently standing by for television transmission from the spacecraft scheduled to begin in little less than 9 minutes at 84 hours ground elapsed time.

CAPCOM Hello 12. Houston. Any words on your observations?

S/C Well, Houston, just looking at one very, very, odd, and it looks like a very fresh impact crater that sort of collapsed on one side - that we have been looking at - discussing a little bit. Its got some fairly high-raised sides on it and we haven't quite got ourselves oriented to the proper size yet. I think these craters are much bigger than anything we have ever seen on earth so we are just sitting here discussing various sizes and getting ourselves oriented on the map. I just broke out the monocular and we are starting to look with it.

CAPCOM Okay.

S/C One interesting thing, Paul, was that in some of these large craters - the older ones it looks like - as you look towards the distance, you can see that they - at least from here - appear darker and it looks very flat like the Mare looked from earth but the same size ones you pass right over - they don't look a bit darker than any other of the terrain. I guess it must have something to do with the way the sun reflects off the surface. We are passing a beautiful impact crater here on our right side now. It's got many, many, long rays - it's a beauty.

CAPCOM Roger, 12.

PAO That was Al Bean commenting on the lunar surface below them. The spacecraft currently 87.1 nautical miles above the lunar surface.

S/C This impact crater that we are going over right now, which has such a fantastic ejector pattern that we can see it so well. The ejector pattern has got to go out 50 or 60 crater diameters. Very easily discernible with the eye. You can almost - you can pretty well tell the direction of the

APOLLO 12 MISSION COMMENTARY, 11/17/69, 22:10 CST, GET 83:48:00 212/2

S/C impact from looking at the injector blanket but it is really spectacular.

CAPCOM Roger 12.

S/C Okay, Houston. We will be coming up with the TV in just a few minutes.

CAPCOM Okay, 12. Can you see Langrenus yet?

END OF TAPE

SC Say, Houston. We'll be coming up with T.V. in just a few minutes.

CAPCOM Okay, 12. Can you see Langrenus yet?

SC No, we can't quite see that yet, but we've been looking over at Humboldt, and looking at all the great fracture marks in it and everything. Actually it looks to me some criss-cross roads down there in the desert or something. Be interesting.

PAO We're starting to get a television picture now from the spacecraft.

CAPCOM We're starting to get a picture now.

CAPCOM Hello, 12. Houston. We're starting to get a picture now.

CAPCOM 12, Houston. For information you should be crossing 60 degrees east at 84:02:08.

SC We agree. What do you see on the tube, Houston? I can't tell very much from the monitor.

CAPCOM Okay. We're getting the lunar surface. It appears that we can see the sub-solar point or could at one time there. We can see numerous small, light-colored craters.

SC I'm going to hand it over to Dick. He's got Langrenus out the window.

CAPCOM Okay. Very good.

SC We're coming up on VOX to you, Houston.

CAPCOM All righty.

SC Dick's got the camera. He's pointing it over towards Langrenus, now. This Petavius over here is a beautiful thing. Whenever you get finished, I'll see if I can shoot that.

SC Okay. It's got high peaks in the middle. What happened to the monocular?

SC Here it is.

SC The Moon - here's the central peaks right here in Langrenus right there. See those pretty well.

CAPCOM Okay. Roger. We're picking it up. On the screen, the colors appear to be green to brown. Can you describe the colors in the scene that you're seeing there now?

SC That'll do for now. The mountains are sort of in the center of Langrenus. I'm looking at them through the monocular, and apparently, they look very smooth with the naked eye, but by looking through the monocular, I can pick up these black dots. They're very black, and they're obviously very large boulders sitting around on it.

CAPCOM Roger. The picture on the T.V. screen of the central peak - it looked kind of - it appeared to be rather rounded.

SC Yes, it appears to be rounded, but it's got a lot of big boulders sitting on it. I'll hand the camera over to Al, now. He's got some stuff out his window.

CAPCOM Okay.

SC Oops, that's one for the geologists. The materials out his window you want us to shine down on.

SC I see (garbled) myself.

SC You were asking what color it looks like from here. It's changed slightly as we went around it. At first, it had a very, very light gray-white concrete appearance. Now, it has more of a - it's still a light gray concrete, but it has a little - just a touch of brown in it. At least, that's the way it appears to me. That's the Moon that's directly below us. Of course, there's several places that are very very white. Now, I'll point the camera at one of them now. It's a small crater and it's very symmetrical. It just looks like a cone with a flat bottom. If you can see that.

CAPCOM Roger. Okay, it's gone out the top of the screen. Can you move up and pick it up just a little. There that's good.

SC There you go.

CAPCOM I understand that - that the crater appears to be white down inside, Al. Is that right?

SC Well, it's pretty bright. It's white and then it's got some radial streaks of more darker material. It's woven down or at least runs from the rim down to the center down to the flat bottom. I think that you can see those on the T.V. Let me show you a real bright crater that's more toward the horizon, but it's one of the very very bright ones. Can you see that? I'll try to put it right in the center.

CAPCOM Okay. I can see one that's just a little bit above the edge of the window there.

SC Right. Another interesting thing is this white or gray-white Moon in contrast very startling with the black sky just like everyone has reported. Maybe even so on the T.V. down there. But the black is about as black as you've ever seen in your life. It's just - doesn't have hues or anything to it. It's just solid straight dull black. The Moon is just sort of very light concrete color. In fact if I wanted to look at something that I thought the same color as the Moon, I'd go out and look at my driveway.

CAPCOM Okay.

SC Even Earth orbit at night or in the daytime, the sky was never as black as it is here. This is the blackest black I ever saw it. Al described it as dull and it doesn't even seem like a dull black when you look at it on the horizon.

SC To me, it's like an ebony black. It's as cold black as I've ever seen. Okay, I'm going to pass the T. V. over to Dick now. Show you there's a very interesting crater that Dick's got down there. There's another one that I'm looking into. It's the first one I've seen with the fractures in the bottom of it that we've flown right directly over. There's a fracture pattern that runs right through the middle of the crater including the rim of it. Perpendicular to it. Crosses all the way across the crater, so that gives me the feeling that the fracture pattern - that particular fracture doesn't have anything to do with the crater.

CAPCOM Roger. Okay, what are looking at there now, 12. Is that the bottom of the crater or a mare area?

END OF TAPE

SC All set.

CAPCOM Okay. What are we looking at there now 12?
Is that the bottom of the crater or mare area?

SC That's at the bottom of a crater, a large mare area actually, Paul. And in the crater there are two (garble) mare, there are two brand new craters that have fairly detailed gray patterns going out from them. They're quite startling when you see them because they are perfect radial patterns from two of them right next to one another.

SC The edge is pretty interesting. As a matter of fact, that one ray pattern looks like it's only one direction. It look that way to you today?

SC Yes. It's looks like it's pointing towards us.

SC Yes.

SC That is a double ray pattern - just a single one.

CAPCOM Roger 12.

SC Oh, that is a beautiful crater over here to the right. It's not particularly spectacular but it's symmetrical and its got some interesting sloping in on the side. It looks like an old, old one.

SC We are getting ready to pass over the Sea of Fertility right now, yes we are over. A lot of riles and some cracks in here we ought to be able to pick up on the TV.

SC We're passing over the Sea of Fertility now and it is a little bit darker than the terrain that we've been over but not so much - it's more of a just a slightly darker gray.

CAPCOM Roger 12.

SC Looks like the beach sand down at Galveston whenever its wet.

CAPCOM Okay. We had a team of geologists checking your driveway. We'll send him to Galveston now.

SC (Laughter) Okay.

SC Looking down into a real fresher packed crater in the Sea of Fertility and with the minocular I can see some pretty large boulders. So I guess as high as we are if I can see those boulders they must be pretty darn big.

CAPCOM Roger. We can see that crater in the lower left part of the screen, right now.

SC Let me see that impact crater you've got something to show them.

SC Hey Alley, I'll show you.

SC What is fairly bright.

SC you can sure see the direction that one came in from can't you Pete? There's hardly any ejected to

SC our right, which would be to the South, I guess.

SC That one your looking into now, Houston is the one I meant. Man, its really got some big boulders in the bottom of it.

CAPCOM Roger. Your breaking up a little on VOX, Pete.

SC Sorry.

CAPCOM Okay. We see that crater there which has a ray pattern through about everything but about a hundred and ten a hundred and twenty degrees of it off to the right. Is that the one to which you are referring?

SC That's - yeah that's right. That's correct.

CAPCOM I understand that you can see large boulders in the bottom of the crater.

SC Yeah, and also on the sides of it.

CAPCOM Hey, there's a big one we have right there now.

SC Yeah, that one just came into view. I guess that's still on the Sea of Fertility. Yeah, it's still in.

SC And there's this big one -

SC We're getting ready to pass over Theophilus here Pete. It's going to be right down at your lower one o'clock. That's a good picture too.

SC Lower seven o'clock.

SC Yeah, you - that's a beauty.

SC Oh there it is.

SC See it.

SC Yeah. There's Theophilus.

SC That one we were showing you a moment ago doesn't have a name. It's interesting just to the - behind that small one you were showing. It's sort of a whole streak of light colored material that runs for hundreds of miles there and it's in different shape. Maybe it's just the elevation in that area, I don't know. It's a - central peak, though, we'll keep a binocular on it.

CAPCOM Okay, and -

SC We're close to the central peaks in Theophilus.

CAPCOM Rog. We get them good in the screen and we saw that large white rays as you switched windows there. The peaks of Theophilus -

SC It's kind of interesting if you look right on - One thing about the peaks, I'm looking at them through the binocular and on the top of the peaks you can see a great number of, what appear to be boulders and they must be huge to be visible from the altitude we're at right now.

CAPCOM Okay. Understand there are boulders on the top of the peaks and they look like some fairly well defined ridge lines in that central peak. Is that why they look through the minocular?

SC That's right. That's right. That TV must be doing real well because from here it looks like very sharp ridge lines and if you look on either side of the ridge lines you can see sort of a terracing a mild terracing effect that's parallel to the ridge line. It could be some form of something, in fact, some sort of transportational mechanism there, I don't know what it is. Probably gravity. Obviously you can see some what have become rills and Earth (garbled) running down from the ridge line. They're running perpendicular to it, more or less.

CAPCOM Roger. We're looking at -

SC You must be able to look over to your side real far on the

SC And then and see the Sea of Serenity and some of those craters over in there. They ought to be pretty good contrast with that dark bar. Is there any over there?

SC There's plenty of them.

SC That might be interesting. Hey, there's some pretty good cracks over there. We're going to change windows here. There's some beautiful rills over in the other side, north side.

SC I don't know, maybe we ought to try this one. Let me see. Can you see them out of that one better?

SC Boy, that is beautiful.

SC (garble) TV camera, (garbled). Where'd it go?

SC There's some craters over here, big long ones and come down the -

SC Don't waste none of that.

CAPCOM There's a very sharp crater you can see in the top left part of the screen right now. In the view we can see now there appears to be a dark line running from the lower left up toward the top center. Can you make anything out of that?

SC Yeah. That's what I'm trying to show you.

CAPCOM Okay. We're -

SC Looks like some dirt. Looks like some fairly deep rills and droppings over there particularly the ones that you ask about. They're very, very deep. There's a nice wide one over there, Pete. Can you see it? Over by that fresh impact (garble).

SC Maybe it would be better to take the camera to the other window.

SC Yeah. Put it over there with Dick.

CAPCOM 12, Houston. In that scene you just shifted

CAPCOM from, there appear to be two parallel rills that - you confirm that.

SC That's, that's correct. As a matter of fact, in looking at it there are two parallel rills and then they actually pick up, well not quite a third one. It's like one ends on one side and the middle one goes all the way through and then one picks up on the right hand side.

CAPCOM Rog. Understand. The picture's -

SC There are two parallel droppings in the sea.

SC Also on that rill one of the last things we saw and at the Cape when we talked with the geologist was the little experiment that the guy did blowing air through the sand

END OF TAPE

SC one of the last things we saw at the Cape when we talked to the geologists was the little experiment that the guy did blowing air through the sand, my guess is that sure enough I've got some examples of that right here in those trench-like structures, there's some crater chains running through them and along side of them, just like -

SC For example there's a big giant up here blowing sand all over the place.

CAPCOM Okay. Understand now. We can see - just a minute ago a furrow or trench coming from the lower left side of the screen up towards the center and kind of ending in a string of rather poorly defined craters.

SC Roger. There's one up here that's actually a double crowned, it's not off center, two running parallel to each other.

SC Hey, Dick, see the double craters right there? See the grobbins running along side of - and see the little string - it looks like a string of craters? Two sets of them. Can you give them that on the TV?

SC I may get it out of this window. Wait a minute.

CAPCOM 12, Houston. While you are setting up, how's the view out of your windows now?

SC Pretty much the same, Houston. Window No. 5 is a good one, window No. 4 is poor, window No. 3 is just a hatch window, is not - it's still the same condition it was in launch. All of them are. But, since we've got a bright background instead of the dark background we had before, the marks on them aren't quite as noticeable.

CAPCOM Okay. We're getting very good pictures here.

SC -- window No. 2.

SC Okay. this is up north. Can you see it Earlier there was a whole bunch of - looks like vent holes going along these rills. Can you see those from the ground, Paul?

CAPCOM That's affirm. We could see them before. You just moved off of what appears to be a rill moving toward the right now.

SC -- over on your side there, Dick.

SC Yes. There's several - a whole bunch of areas in here just looking out the window generally. They give you the feeling that, as we talked about with the geologists, if some of this is volcanic action in here.

CAPCOM Okay. We can see a crater just to the left of the screen there that poorly defined and appears

PAO to be a good sized rille or fracture running across the fork.

SC Hey, we've got the straight wall coming up on this side, Houston. When it gets a little bit closer I'll show it to you. It's a beautiful straight line.

CAPCOM Very good.

SC Also, we've got a couple - here, let me borrow that thing just a minute.

SC Okay. Kind of ridiculous, don't you think?

SC Got the camera over there?

SC Yes. Wait a minute. I'll get it for you. Now I don't know where you put it. Where did you put the hasselblad?

SC Can you see the straight wall now, Houston?

CAPCOM Yes, sir. We can see it very good. Just beyond that large crater was another smaller crater and it's rim and we can see that wall on beyond that.

SC - picture that. Does anybody know?

SC We got this little chart right here.

SC Since - since the update we've been here 56 minutes, so leave it 56 minutes, data.

SC I'm going to move off the straight wall, now, Houston, and look down at a crater. I don't have the chart here, so I don't know the name of it, but it's got extremely well defined terraced walls. It's got a nice central peak in the middle. And let me see if I can get it better for you, there it is.

CAPCOM Roger. We have a good one there, Al.

SC And it also has a nice crack right down in the bottom.

CAPCOM Roger. We see that.

SC That's a pretty impressive looking crater.

SC We're in the terria now and you can tell that the ground is much more homage and quite a bit rougher than the Mare which is we're getting ready to approach in just a few moments. Here's another one with a good central peak. In fact, this is one of the highest central peaks. That's a hard one to show because the radar antenna of the LM is partially eclipsing it. Do you see that central peak there?

CAPCOM That's affirm -

SC I'm told -

CAPCOM We're getting a good -

SC It's almost as high as the rim itself.

SC Okay.

SC The sun's getting a lot lower now, as we approach the terminator. There is a bunch of rocks

SC to release. Let me point the camera back past the straight wall again. Let me give you another view of that, because it's coming into a greater release from this angle. Then I'll go back and give you your horizon, because that's one of the most impressive sights right here. Take a look at those mountains.

CAPCOM We have them.

SC I'll move a little bit around and see if I can - here are some of those mountains that we talked about earlier. It looks like from the distance, like little clouds over the Mare. You can see how bright they are relative to the briary surface. And maybe on the TV, they look like puffy clouds. They are not. They look like hard rock down there.

CAPCOM Roger. I understand they are not clouds.

SC (garble) I'm not sure, were they Dick, Fete?

SC Too dark.

SC It's getting dark.

SC Boy. There is a high mountain back there on the horizon. Do you see that very high mountain on the horizon, Houston? It's about the center of the screen now. All you can see is reflective light.

CAPCOM Affirmative. We have - 12, Houston.

Can you open your S-stops any - get in this dim light?

SC That will happen. We'll try it.

SC How's that look, Houston?

CAPCOM That's better.

SC Sure looks better here. Here's an interesting feature down there, that your looking at near that large crater. The hose seems to be a general trending of ridges in this area, all in the same direction. They'd be running I guess on your cameras from the top right hand corner to the lower left. And it's particularly evident down there by the large crater that's in your picture.

CAPCOM Roger. We see that.

SC There it is now. Do you see it?

CAPCOM Affirm.

SC Interesting. There's - I guess it's probably parallel to - Let me show you some more of these clouds. I think you'll like them. They just seem to be large bumps on top of the Mare. (garble) Okay, here you go. (garble) just came in view. See those valleys up to the north?

SC I'm looking at them now.

SC All right, now.

SC You can open it again, if you want it.

It's the close one in.

SC Boy, it's beautiful. Look at that crater.

Wow.

END OF TAPE

SC Do you show those valleys up to the north?
You know where to get it if you want it, it's the close one in.
Boy, it's beautiful right in - look at that crater. Wowiee.

SC (garbled) pretty impressive in this light.

SC Yes, that's a -

SC Here you go, Houston.

CAPCOM We got it.

SC I believe that's Mosting.

CAPCOM Roger.

SC Mosting.

SC Now it's starting to get a little dark outside.

SC Hey, when you get finished, there's a beauty
over here, Dick, whenever you're finished there's a beauty
over here.

SC If we ever get where we get that low sun angle
we can see those little craters within the big ones. I
think they're probably in all of them, we just can't see
them. There's the sun in this one. It looks like somebody
hit it with a bunch of buckshot right -

SC I wonder which one of those shadows down there
is a 5 degree sun angle?

SC I don't know. Go 5 degrees from the termi-
nator.

CAPCOM Hello 12, Houston. You just passed over a
5 degree sun angle on the surface.

SC Okay, that's what I was just trying to look
at here to see what I could see. (garbled) Yes there's
some beauties over here. We got a beauty for you, Houston.
Right in the terminator. See if I can run up the (garbled)
for you.

CAPCOM Okay, that's coming in good, Al.

SC Take a look at - down in that crater, the
number of other small craters.

CAPCOM Roger, we see them.

SC That's fantastic. Let me - soon as you look
at that I'll show you the horizon and near the terminator
on the horizon just to the right you can easily see the
curvature of the Moon and you can also see the stark contrast
between the horizon and the bright nobs and the dark crater.
I'm moving over there now. There's the straight wall again.
Hey, Paul, all I can say is it's another fighter pilot's life.
Hours and hours.

CAPCOM Roger.

SC How's that look, Houston?

CAPCOM That's looking good, Al.

SC That crater's a beauty out there. The rim is
illuminated by the low side while down inside the crater it's
dark and you can see the ray patterns from here and you can
see the mare surface. It almost looks like somebody took

SC some cake icing and spread it with a big knife, laid it all around out there and then somebody shot some bb's in it. It really is beautiful. It's got that layering all over it. And, that's not up Pheita Valley. Got something over there? Let me hand it back to you. Okay. Now the channel stick. Now I need a terminator. Got to have Copernicus out there somewhere. You should see all that stuff that's on the window. That's why that window isn't any good for photography out of it. The sun's really shining right on it now.

CAPCOM Roger. We can see all that stuff, Pete. However, we're getting a good picture through it in the open spaces.

SC I guess Copernicus is too far out there to see, isn't it, Dick, or can you see it? It's on the horizon you can't even - Correct - Yes. Guess we passed it a minute ago. That silly thing floating out by the window. Where'd the boot go? There it is over there. Oh. Are we maneuvering in some way? Now where'd that little piece of blue and gold stuff - whatever it is. Must be my line. No. Well, Houston, that looks like that's about it for this pass.

CAPCOM Roger, 12, very good show.

SC 3 minutes late. Let's go, Alphonsio.

CAPCOM Hello, 12, Houston. For information, all spacecraft systems are in excellent shape.

SC 12. Roger. Thank you.

PAO This is Apollo Control. We're showing the spacecraft now in an orbit of 168.7 by 62.6 and at present time nearing apogee - or we should say apolune. The current altitude, 167.8 nautical miles.

CAPCOM 12, Houston. Map update when you're ready.

SC Just a second, Houston. Go ahead.

CAPCOM Okay, LOS 85:08:42, 85:31:16, 85:52:27.

SC Roger. LOS 85:08:42, 85:31:36, 85:52:27.

CAPCOM Okay, the time at 180 degrees was 85:31:16.

SC Okay, got it.

CAPCOM Roger.

CAPCOM Hello, 12, Houston. On the ground we're seeing some changes in signal strength both up and down. Have you changed any of your communications modes recently?

SC No.

CAPCOM Okay.

SC You mean over the last 2 minutes or what?

CAPCOM Yes, 12, just in the last 5 to 10 minutes.

SC The only thing we've done is turn the TV off.

Let me double check. All the other COMM switches appear to be in the normal position and the only thing we did was turn the TV off.

CAPCOM Okay, thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/17/69, 23:00 PM,CST, GET 84:38:00 211/1

S/C All the other comm switches appear to be in the normal position and the only thing we did was turn the TV off.

CAPCOM Okay. Thank you.

S/C Your comm to us has been super.

CAPCOM Roger. Same here.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/17/69, 23:10 CST, GET 84:48:00 218/1

CAPCOM Hello 12, Houston. 5 minutes to LOS, we will see you in 49 minutes.

S/C Roger, Roger, we're settled down to a nice meal and we're allowing ourselves a little music on the tape recorder. We will see you on the other side.

CAPCOM Okay, who won the vote on what your playing on the tape recorder?

S/C We've been very democratic, we play a little bit of Al's and a little bit of Dick's and a little bit of mine.

CAPCOM That's nice.

S/C Generally not in that order.

PAO This is Apollo Control at 85 hours 7 minutes. Flight Director Glen Lunney, now going around the room getting a final status before loss of signal. We will be loosing contact with Apollo 12 in 1 minute 40 seconds, reacquiring again at 85 hours 52 minutes 26 seconds. We are now 1 minute from loss of signal, everything looking good as the spacecraft goes around the corner, we will be reacquiring in little less than 44 minutes. We have had loss of signal now, acquisition to occur in 43 minutes 24 seconds. Apollo 12 currently in an orbit 168.7 by 62.5. The orbital period is 2 hours 8 minutes 48 seconds. We are reading an orbital weight of 71,983 pounds at the present time. As we lost acquisition with the spacecraft, all systems looking very good. At 85 hours 10 minutes, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 86 hours, 12 minutes. During the replay of the video tapes from the television transmission we reacquired Apollo 12 on schedule. We've been in contact with the spacecraft now for about 19 minutes. We'll pick up the tape recording we have of the conversation about 3 minutes up to now and then continue to standby for live conversations.

CAPCOM Hello 12, Houston.

SC Hello Houston, Apollo 12. Loud and clear.

CAPCOM Rog, same. In an attempt to trouble shoot this variation signal strength which we experienced for a little bit after the TV pass will you verify the position that you had the high gain antenna track switch in at that time please?

SC It's in narrow.

CAPCOM Oh, okay. How about the track switch?

SC We had it REACT.

CAPCOM Rog, REACT.

SC It was in REACT.

CAPCOM Rog. Thank you and -

SC Roger, and it's still in REACT narrow.

CAPCOM Okay, understand and I've got an update to your CSM alternate and contingency check list if you want to break it out.

SC Okay, give you a call in a second. Go ahead.

CAPCOM Okay. On page 1-32, Dick.

SC Okay. Go ahead.

CAPCOM Okay, in calling Charlie -

SC Are you going to give me (garbled)?

CAPCOM Say again.

SC Go ahead.

CAPCOM Okay, in calling Charlie line 7 the number was formally 27340. Change that to read 22434. This puts in the new delta H from your P23.

SC Okay. We've all ready got it in.

CAPCOM Rog.

SC Okay, Houston. Be advising on the waste water to 10 percent purge to fuel cells.

CAPCOM Understand, 12. And 12, Houston. I've got your map update for REV 3.

SC Okay. Go ahead.

CAPCOM Okay. The numbers are 871709 873940 880122, over.

SC Okay. Copy 871709 873940 880122.

CAPCOM That's affirm. Apollo 12, Houston. If you'll give us POO and ACCEPT we'll give you a state vector and a target load.

SC It's all yours.

CAPCOM Thank you. Apollo 12, Houston. The computer's yours.

SC Okay, Houston. Thank you.

CAPCOM Hello Apollo 12, Houston. I have 2 pads for you when you're ready to copy.

SC Roger, Houston. Go ahead. We're ready to copy.

CAPCOM Okay. First pad is LOI2. That's an SBS G&N 38627 plus 145 minus 066 087 48 4739 minus 01392 plus 00001 minus 00895 360 220 360 00662 plus 00541 01655 017 01594. Your sextant star is Formalhaut 452966 273. Your ullage will be 2 jets for 19 seconds. Your sextant star will be acculted by the Moon until 87 hours. Over.

SC Roger. Would you just give me the noun 47 again.

CAPCOM Rog. That's 38627.

SC Okay. LOI2 that's PS G&N 38627 plus 145 minus 066 087 48 4739 minus 01392 plus 4 balls 1 minus 00895 360 220 360 00662 plus 00541 01655 017 01594. Formalhaut 45 2966 273. Two jets ullage 19 seconds and sextant star is acculted until 8700.

CAPCOM That's affirmative and I have a TEI 5 pad when you're ready.

SC Okay, we're ready to copy.

CAPCOM All right. TEI 5 SBS G&N 37452 minus 064 plus 050 093 40 3235 plus 37451 plus 10068 minus 02757 NA 081 the rest of the pad is NA. Your ullage is 4 jets for 11 seconds, that's an undocked burn and assumes LOI 2. Over.

SC Okay. TEI 5 SBS G&N 37452 minus 064 plus 055 93 40 3235 plus 37451 plus 10068 minus 02757 NA 081 rest of pad is NA. I believe you said 4 jets for 11 seconds assumes LOI 2.

CAPCOM That's affirmative and it's an undocked burn and your yaw trim for noun 48 is plus 050. Over.

SC Okay. Yaw trim plus 050 and it's undocked.

CAPCOM Rog.

PAO This is Apollo Control. That brings us up-to-date with the tape playback. We'll continue to standby live now for the rest of this frontside pass. Currently our displays here in Mission Control show the spacecraft at an altitude of 130.8 nautical miles. Our current orbital figures are 169.5 by 61.6 and we show a combined weight of the CSM, LM in orbit of 72 212 pounds. Included in the series of numbers read up to the crew were the numbers that they will use for the Lunar Orbit Insertion 2 maneuver, the burn which essentially circularizes the orbit changing the orbit from a 169.5 by 61.6 to a 54 by 66 nautical mile orbit and this orbit is targeted so that by the time the LM is ready to lift off from the Moon and complete the rendezvous sequence with the orbiting Command Module it should be essentially circular at about 60 nautical miles. The LOI

END OF TAPE

PAO Essentially circular at about 60 nautical miles. The LOI-2 ignition is set for 87 hours 48 minutes 47 seconds. The total Delta V will be 161.6 feet per second, if total burn time of 17.07 seconds.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Okay, Pete throughout the flight your oxygen consumption has been slightly higher than previous flights, by approximately 10 per cent. This is no problem as extrapolating that and the mission still gives us plenty of oxygen available in an attempt to try to figure out why though, we have a couple of questions. Primary with respect to your use of the URA. Approximately how long after use do you leave the cover valve in vent before you close it? Over.

SC We usually keep it on until the O2 high light comes on, which is a couple of minutes worth of venting.

CAPCOM Okay, and what position do you leave the cover valve and the waste management overboard drain valve when you are not using the URA?

SC Usually shut the dump valve off, leaving the cover in vent.

CAPCOM Roger, we got that. We will message that, thank you.

SC Okay, we probably have used a little more oxygen through that, and we noticed on our plot that we were running a little low on oxygen also.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, 01:00 CST, 86:38:00 GET 221/1

SC Houston, 12. Are you looking at the DSKY?
CAPCOM Okay. We're looking at it. Stand by.
CAPCOM Okay. We've got it, 12. Thank you.
SC Okay. We're torquing.
CAPCOM Roger.
CAPCOM Apollo 12, Houston. You're rolling
into the high gain limits. Give me OMNI Charlie, please.
SC Roger.
CAPCOM Hello, 12. Houston. Give us OMNI DELTA,
please.
SC Houston, Apollo 12.
CAPCOM Go ahead, 12.
SC Roger. You can see quite well and the
Earth's shining up here. The LM is illuminated very brightly
as it's fairly reflected, but the Moon itself is fairly easy
to see. And Earth shines quite beautiful, real soft and sort
of gives it a greenish tint. Gray green.
CAPCOM Roger. Understand. And you say that the
LM is illuminated by Earth shine.
SC Yes. Real well. It's very reflective
itself and so it looks almost like the soft sunlight if there
is such a thing. But you can, for example, look out and
read the marks on the commander's overhead window, you can
see all the quads, the struts, and they're pretty up here
in Earth shine. Kind of give it sort of a gray-green cast,
though.
CAPCOM Roger. Understand.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/18/69 CST 01:25 GET 87:03 222/1

PAO This is Apollo Control at 87 hours 9 minutes.
We're now 8 minutes away from loss of signal. Here in Mission
Control presently changing shifts. Flight director Pete Frank
will be replacing flight director Glen Lunney. The capsule
communicator on this shift will continue to be astronaut Paul Weitz
for the first part of the shift. Don Lind taking over at
about 4:30 this morning. The lunar orbit insertion number 2
maneuver scheduled to occur 39 minutes from now. That burn
is targeted for an orbit of 54 by 66 nautical miles. Time
of ignition is tentatively set at 87 hours 48 minutes
47 seconds with a burn time of 17.07 seconds and a total
Delta V of 165.5 feet per second. As we near the end of this
front side pass all systems on the CSM continuing to look
very good. Flight director Glen Lunney will be getting a
final status from his flight controllers prior to loss of
signal and we expect passing along a goal for the lunar
orbit insertion number 2 maneuver. At 87 hours 11 minutes,
this is Apollo Control, Houston.
CAPCOM 12, Houston. 5 minutes to LOS.
SC 12. Roger.

END OF TAPE

SC Okay, Houston. We just called P-40 for you to take a look at it before we disappear.

CAPCOM Roger, 12.

CAPCOM Apollo 12, Houston. You're go for LOI-2 and your PIPA's look real good.

SC Roger, Houston. Go for LI - LOI - 2.

CAPCOM It's been a long night here, too.

SC No. What happened I had the water gun half in and half out and I was trying to talk and drink at the same time. Actually, we're - it's kind of interesting Dick and Al and I have really switched over to this time schedule and we're quite happy on it. We - we're not really aware of the fact that it's the middle of the night back there.

CAPCOM Roger.

PAO And we've had loss of signal on the second revolution. We're now 31 minutes, 21 seconds away from ignition for the LOI 2. Scheduled to reacquire the spacecraft in about 45 minutes. And as you heard toward the end of the of that pass, we gave the crew a go for LOI 2. All systems on the spacecraft continuing to look absolutely nominal. We have completed the change of shift at this time. Flight director, Pete Frank, now, taking over from flight director, Glen Lunney. At 87 hours, 18 minutes, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston. We're now at 87 hours, 44 minutes into the flight. We're less than 5 minutes away from our scheduled time of ignition for Lunar Orbit Insertion burn number 2. This burn designed to lower our apolune and bring us to an orbit of 66 nautical miles by 54 nautical miles. The burn is scheduled for some 16 or 17 seconds duration. We're presently passing around the far side of the Moon. We are scheduled to reacquire the spacecraft in 16 minutes. This is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, 02:11 CST, 87:49:00 GET 225/1

PAO This is Apollo Control, Houston. We should be burning LOI 2 at this time. We're at 87 hours 49 minutes into the flight. We will not reacquire until 11 minutes 45 seconds from my mark. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/18/69 CST 02:23 GET 88:01 226/1

PAO This is Apollo Control at 88 hours 1 minute into the mission of Apollo 12. We'll leave the line open at this time. Apollo 12 is now on it's third revolution around the moon.

PAO Apollo Control, Houston. We have data at this time.

CAPCOM Hello, Apollo 12, Houston.

SC Hello, Houston. Apollo 12. LOI 2 burn complete. The burn was on time. The burn time was 17 seconds. The residuals were plus .30 plus .1. Delta Vc was minus 4.4, fuel 35.4, oxidizer 35.9, increase 110. We're in a 66.3 by 54.7 according to us. Over to you.

CAPCOM Roger, 12. We copy.

SC And we have Bat B on the charger at this time.

CAPCOM Roger.

PAO You heard that report from Pete Conrad aboard the spacecraft. 66.3, 54.7.

SC Al is photographing off the target of opportunity chart here in order and we're trying to get as much of that stuff done as we can.

CAPCOM Roger, 12.

PAO LOI 2 has been completed almost exactly as advertised.

END OF TAPE

PAO This is Apollo Control, Houston. Mission Control sender numbers almost precisely coincide with the onboard numbers, so we show 66.1 nautical miles by 54.3 nautical miles on the ground. We are at 88 hours, 5 minutes into the flight at this time.

SC Okay, Houston. Apollo 12. We've gone to LM press on our valve to bring the LM up.

CAPCOM Roger. 12.

PAO That was spacecraft commander Pete Conrad reporting that their pressurizing the LM at this time.

PAO This is Apollo Control, Houston. We have had no contact with Apollo 12 for the last several minutes. However, flight director, Pete Frank, has gone around the room consulting with his flight control personnel and all data appears quite nominal at this time. As Apollo 12 progresses on its third revolution around the Moon.

CAPCOM 12, Houston. If you'll give us Poo and Accept we can give you a clock update.

SC Okay. Poo and Accept it is.

CAPCOM And 12, Houston. I have a map update pad and a landmark tracking pad, when you're ready.

SC Okay. We're ready to copy.

CAPCOM Okay. A map update for REV 4. 891309, 893759, 895918. Over.

SC Roger. Map update, 891309, 893759, 895918.

CAPCOM That's affirm. Are you ready for your landmark tracking pad.

SC Roger. Is this H 1.

CAPCOM That's affirmative. H 1.

SC Okay. Go ahead.

CAPCOM Okay. Under computers yours and the H 1 pad. T1 is 903541, T2, 904050, The offset is 12 miles north. Over.

SC Roger. 12 miles north. Okay. 903541, 904050, and 12 north.

CAPCOM That's affirmative.

END OF TAPE

PAO This is Apollo Control, Houston. We presently show Apollo 12 at an altitude of 63.8 nautical miles. It's velocity now reading 5326 feet per second.

SC Houston, 12

CAPCOM Go ahead, 12.

SC (Garble) number 10 was (garble).

SC Houston

Capcom Roger.

END OF TAPE

PAO This is Apollo Control Houston. We presently show Apollo 12 at an altitude of 58.6 nautical miles above the Moon. Apollo 12 will be coming into lunar night shortly. At that time the 12 crew will routinely realign their computer platform. We're at 88 hours, 45 minutes into the flight.

PAO This is Apollo Control Houston. We're monitoring the display in Mission Control which shows the onboard data. The crew is presently realigning their platform. We've got some 20 minutes remaining on this pass where we'll have Apollo 12 under acquisition. We're at 88 hours, 53 minutes into the flight. And this is Apollo Control.

SC Hello Houston, 12.

CAPCOM Go ahead, 12.

SC And if we can have the DSKY or the torquing angles.

CAPCOM Roger, we got them.

SC Okay. I'm torquing at this time.

CAPCOM Roger.

PAO That was Dick Gordon talking to Paul Weitz here in Mission Control Center. We're at 88 hours, 55 minutes into the flight at this time.

SC Houston.

PAO This is Apollo Control Houston. We're presently at 89 hours into the flight. Apollo 12 is nearing its perilune. Its present altitude 55 nautical miles above the Moon. We have 13 minutes until we lose signal with Apollo 12 passes over the back side of the Moon. And this is Apollo Control Houston.

PAO This is Apollo Control Houston. We're less than 10 minutes away now from time of loss of signal. As Apollo 12 passes around the back side of the Moon Commander Pete Conrad and Al Bean are scheduled to transfer into the Lunar Module. Flight Director Pete Frank in Mission Control just called his Flight Controllers and said if we have any words of wisdom for the crew before they transfer lets please pass them up within the next few minutes. He's received no response from any member of his team at this time. We're at 89 hours, 4 minutes into the flight.

END OF TAPE

SC Hello, Houston; 12.
CAPCOM Go, 12.
SC Roger. The tunnel's clear and we're going in
the LM.
CAPCOM Roger, 12.
PAO That was a call from Pete Conrad to Paul Weitz
indicating that the tunnel is clear and they're ready to
proceed into the lunar module.
CAPCOM 12, Houston. 5 minutes to LOS.
SC 12. Roger.
PAO That was Paul Weitz telling Apollo 12 we've
got 5 minutes until time of loss of signal as Apollo 12
passes over the backside of the moon.
PAO This is Apollo Control, Houston. We're 2 minutes
away now from loss of signal.
PAO One minute away now from scheduled time of
loss of signal.
PAO This is Apollo Control, Houston. Network has
just identified to flight director Pete Frank that we've had
loss of signal. On this front side pass very little conversa-
tion between Apollo 12 and the Houston control center. In
fact very little conversation on the flight director's loop
as the mission has proceeded as programed. At 89 hours
14 minutes, this is Apollo Control, Houston.

END OF TAPE

PAO Apollo Control, Houston. We're 2 minutes away now from reacquiring Apollo 12. Apollo 12 now on its fourth revolution around the Moon. As we reacquire spacecraft Commander Pete Conrad and lunar module Pilot Alan Bean, should be in the lunar module. Meanwhile, in mission control center we've had a change of shift among the capsule communicators. Don Lind has replaced Paul Whites in that key position. We're at 89 hours 58 minutes into the flight and presently standing by for reacquisition. This is Apollo Control, Houston.

PAO Apollo Control, Houston. We should be reacquiring momentarily. We presently show an orbit for Apollo 12 of 66 nautical miles by 54.4 nautical miles.

CAPCOM Apollo 12, Houston.

PAO That's Don Lind calling Apollo 12.

CAPCOM Apollo 12, Houston.

SC Hello Houston. Apollo 12. Go.

CAPCOM Very good. Nice to hear your voice.

SC Roger. I answered your report. You must not have picked it up.

CAPCOM Sorry about that.

SC That's okay. Pete now are in the LM or Pete's in half and half and they're going down through their checklist stuff and I'm standing by ready to hear the P22.

CAPCOM Very good.

SC If Jack - if Jack - wanted to go ahead and start the rolls on you'd probably lose me on the high gain on nearly OMNI PNGS when I bring him on.

CAPCOM Roger.

SC And Houston, 12. We just finished ckecking out our OPS's and they checked out 40 both of them.

CAPCOM Roger. Copy. 40 both of them.

PAO That was Dick Gordon first responding or recently you heard from Pete Conrad reporting on their OPS system aboard the lunat module. Both Conrad and Bean presently in the LM.

PAO This is Apollo Control, Houston. We're at 90 hours 4 minutes now into the flight. We presently show Apollo 12 at an altitude of 65.6 nautical miles above the Moon.

SC Houston, Intrepid.

CAPCOM Go, Intrepid.

SC Roger. We're just standing by till our time 90:30 where we do our comeback division. Everything looks good in the LM. We just checked all the things we're supposed to and their all ship shape. We're ready to go.

CAPCOM Roger. We're ready to go down here whenever your want to do the common checks.

PAO That was lunar module pilot Al Bean, using the code name Intrepid, identifying that their lunar module

PAO ship is in fact ship shape at this time.

PAO We're at 90 hours 7 minutes into the flight. Apollo 12 presently at an altitude of 65.8 nautical miles at its point of apolune. This is Apollo Control, Houston.

PAO This is Apollo Control, Houston, at 90 hours, 10 minutes now into the flight. We don't expect to hear a great deal from Apollo 12 until 90 hours, 30 minutes at which time spacecraft commander, Pete Conrad and Al Bean move inside Intrepid, will checkout the communications systems of the Lunar Module. This is Apollo Control, Houston. Standing by.

SC Houston, Apollo 12.

CAPCOM Apollo 12, go ahead.

SC Houston, Apollo 12.

CAPCOM Apollo 12, go ahead.

SC Roger. We're powering the LM COM at this time so I can get our voice check on VHF A with CSM.

CAPCOM Roger. You are coming in with a lot of background right now, Pete.

CAPCOM Houston. Intrepid. How do you hear?

INTREPID Read you well except for your background, which (garble)

CAPCOM Roger.

INTREPID Yankee Clipper. Intrepid on VHF A. How do you hear?

YANKEE Intrepid, Yankee Clipper, VHF A loud and clear and read you the same.

CAPCOM Yankee Clipper, intrepid. How do you read VHF B?

YANKEE Intrepid, Yankee Clipper VHF B loud and clear OMNI.

INTREPID Read you the same.

CAPCOM Hey, this is sterling.

PAO That's Pete Conrad aboard Intrepid talking to Dick Gordon who is singularly manning the Yankee Clipper this time. We're at 19 hours, 17 minutes.

INTREPID (garble) of the S-band down voice backup and low bit rate. Over.

CAPCOM Intrepid. Houston. We're still reading you well except for the background which is still high.

INTREPID Okay. We're going PCF high now. How do you pick it up?

CAPCOM Roger. Give us just a moment to refigure the site.

CAPCOM Go ahead, Intrepid.

INTREPID How's the voice and high bit rate?

CAPCOM Roger. Just the same Pete. We're still reading you satisfactorily again you've got a lot of buzz in the background.

SC Houston. This is Apollo 12. I'm talking to you on the CSM S-band and Al's talking to you on the Intrepid S-band. Are you sure that that's not a ground problem? We're getting - Al's getting good reception up here on S-band with no noise.

CAPCOM Roger. We'll check it.

END OF TAPE

SC Houston, Intrepid. Just went by on that right, how do we look now?

CAPCOM Your somewhat weaker, but still readable, still considerable background noise.

SC Roger, that's the way we figured.

SC Okay, how do you read now, Houston? Ground noise back up, bio-med low bit rate.

CAPCOM Roger, again you are still somewhat weak, readable and the background is dropping just slightly.

SC Intrepid. Low depth rate with bio-med, how do you copy? Over.

CAPCOM Read you very good on this one, your background has dropped considerably.

SC Houston, we just went to telemetry high. How do you read us now, boys?

CAPCOM Fine on this one, Pete.

SC And we are coming at you telemetry low, and S-band range to range and will you copy the (garble) on hot mike?

CAPCOM Roger.

PAO That is Al Bean and Pete Conrad interchangably coming on the line as we are under going a voice communication check.

CAPCOM Intrepid, would you stand by on this mode, so we can try a range check position?

SC Affirmative.

CAPCOM Intrepid, Houston, how do you read?

SC Loud and clear, Houston.

CAPCOM Very good, read you the same.

CAPCOM Intrepid, Houston -

SC Did you pick up our range then?

CAPCOM That is affirmative, we finished that acquisition. Thank you.

SC Okay and that completes our comm checks we're going to deactivate Intrepid and go back to Yankee Clipper.

CAPCOM Very good, thank you.

PAO That was Al Bean, reporting that they've completed their communication check, they plan to depart Intrepid shortly and return to the Yankee Clipper. Moving somewhat ahead of the flight plan schedule. We're at 90 hours 23 minutes now into the flight and this is Apollo Control, Houston.

CAPCOM Yankee Clipper, Houston. Would you confirm that your in Army Delta?

SC Houston, Clipper, confirm.

CAPCOM Roger, thank you very much.

CAPCOM Intrepid, Houston.

SC Go ahead, Houston.

CAPCOM Roger, two items we would like to get from you before you close that out and that's the OPS storage pressure and also the GET of activation of LM power.

APOLLO 12, MISSION COMMENTARY, 11/18/69, CST 0440, GET 90:18 233/2

SC Okay, I gave you the OPS air, 5800 each and let me look in the book and find out what time we went on the LM power, just a second.

CAPCOM Roger.

SC We went on LM power at 900813.

CAPCOM 90 plus 08 plus 13. Thank you.

SC Houston, Intrepid just went back on PSN power at 902935.

CAPCOM 90 plus 29 plus 35. Roger.

PAO That's Pete Conrad aboard Intrepid reporting the ground elapsed times for power on and power off of the Lunar Module.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/18/69 CST 04:52 GET 90:30 234/1

PAO Meanwhile Yankee Clipper has started its computer program number 22 for orbital navigation. We're at 90 hours 31 minutes into the flight and continuing to monitor. This is Apollo Control, Houston.

CAPCOM Intrepid, Houston.

SC Go ahead, Houston.

CAPCOM We'd like you to confirm that you're going to pull the circuit breaker on the flood lights so that the light will go out when you close the refrigerator door.

PAO The reference there by Don Lind is a flood light on the lunar module which did not turn off at the time of our first transfer to the LM by the two crewmembers. We're at 90 hours, 33 minutes now into the flight.

PAO This is Apollo Control, Houston. We presently show Apollo 12 at an altitude of 61.4 nautical miles above the moon. It's present velocity, 5340 feet per second.

PAO This is Apollo Control, Houston. The E-COMM in Mission Control looking at his data has confirmed the flood light aboard the lunar module is in fact turned off. We're at 90 hours 40 minutes into the flight and Apollo 12 presently at an altitude of 59.4 nautical miles above the moon. This is Apollo Control of Houston.

SC Hello, Houston. Let me know when you've copied that.

CAPCOM Say again.

SC Let me know when you've copied the P-22.

CAPCOM Roger. We've got it. Thank you.

SC Houston, I'm going to look at the latitude longitude from these marks.

CAPCOM That's affirmative. We've got the data, Dick, so you can proceed.

END OF TAPE

SC Hello Houston, Apollo 12.
CAPCOM Go ahead.
SC Hey Don, did you people copy the noun 89?
CAPCOM That is affirmative.
CAPCOM Okay. Let me know how that exercise turned out will you please.
SC Will do. We've got a state vector for you whenever you want to give us the computer and we got a TEI maneuvering pad of 240 and a map update whenever you're ready.
CAPCOM Okay. The computer's yours.
SC Thank you.
PAO This is Apollo Control Houston 90 hours, 48 minutes. As you copied that last con -
SC Go ahead, Houston. Go ahead, Houston.
CAPCOM We'll wait for the high gain antenna to uplift your state vector and the rest attitude in the Flight Plan is good.
SC Roger, Houston.
PAO This is Apollo Control. As you had copied the previous call from the Apollo 12 spacecraft, they have dispensed with using Intrepid and Yankee Clipper identifying to us that Pete Conrad and Al Bean have transferred back to the Command Module. We're at 90 hours, 49 minutes now into the flight and this is Apollo Control Houston.
CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Dick, do you have any comments on the lighting conditions on H1?
SC No, they were excellent. It was very easy to find the target, very easy to mark on. I thought the lighting conditions were outstanding for that.
CAPCOM Very good.
SC Okay, Houston. Why don't you give me the map update and the TEI 11 pad. I'll copy them now and by that time we'll be getting over into the sleep attitude here and give you the high gain in a minute.
CAPCOM Very good. The map update for REV 5 LOS is 91 plus 11 plus 37. 180 position is 91 plus 36 plus 21. AOS is 91 plus 57 plus 45. TEI 11 pad SPS plus G&N. Noun 47 37358. Noun 48 minus 065 plus 049. GET 105 23 5520. Noun 81 plus 31921 plus 07258 minus 01398. Roll and ang, pitch 107, yaw NA. Ullage 4 jets for 11 seconds. And the burn is undocked.
SC Okay, Houston. We have you on the high gain and I'll go to accept at this time and wrap up to you with my 11137913621915745. The TEI 11 pad SPS G&N 37358 minus 065 plus 094 plus - no excuse me it's just 105235520 plus 31921 plus 07258 minus 01398, NA 107, NA, 4 jets 11 seconds undocked.

CAPCOM Roger. On noun 48 the y trim was plus 049.
All the rest was correct.

SC Okay. That's what I have on the pad but I
don't know what I read back to you. I have 049 and how's
the LM current look to you at this time?

CAPCOM Looks very good.

SC Okay. We're in the process of buttoning the
tunnel back up.

PAO This is Apollo Control Houston. The TEI 11
pad is a contingency pad that is stored in the onboard
computer in the event a development occurred that Apollo 12
needed to return on the 11th revolution.

CAPCOM Would you try OMNI delta for us please.

END OF TAPE

PAO This is Apollo Control, Houston at 90 hours,
56 minutes now into the flight. We will again lose signal
with Apollo 12 in about 15 minutes from this time. We
presently show Apollo 12 in an altitude of 55.4 nautical
miles. It's velocity now reading 5371 feet per second.
At 90 hours, 57 minutes continuing to monitor, this is Apollo
Control, Houston.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM We did not get your state vector completed
before we lost you on the pitch there, so we'll continue
that now.

SC Okay.

SC Hello, Houston. Apollo 12.

CAPCOM Go.

SC Hello, Houston. On this for this damp
load for this left handed bit, do you want me to use AC per
roll or BD. Will you get the readings from G and C on that,
please? The flight plan or the simulation?

CAPCOM Roger. We want to use BD, Dick.
Bravo Delta.

SC Okay. Thank you. I thought so.

CAPCOM Apollo 12, Houston. We're through setting
up your state vector and we'd like to try to get an E dump
probe before you go around the corner.

SC Okay. VERB 74 coming at you.

CAPCOM Roger.

SC And we have you out our window for the
first time since we've been in lunar orbit. We've been too busy
to get a look at you. Look pretty nice out there.

CAPCOM Thank you. We're all smiling for you.

SC We're happy up here.

PAO That was Pete Conrad saying that the Apollo
12 crew is happy up there. We're at 91 hours, 3 minutes
into the flight and some 8 minutes away from that time of
lose of signal when Apollo 12 passes above the backside of
the Moon.

END OF TAPE

PAO This is Apollo Control, Houston. We're about four and a half minutes away from LOS at this time. Pete Frank is talking to members of his flight control team to see if we have anything to say to Apollo 12 prior to loss of signal. We're at 91 hours 7 minutes into the flight at this time. This is Apollo Control, Houston.

PAO This is Apollo Control, Houston. We're presently 2 minutes away from predicted time of loss of signal and standing by.

CAPCOM Apollo 12, Houston. We're about 1 minute from LOS here. We'll see you at 91:57.

SC 91:57. Roger. Roger.

CAPCOM Roger. So you can adjourn to the wardroom.

SC We's already there.

CAPCOM Very good.

SC Pretty soon we're going to have movies on the fan tail.

CAPCOM Very good.

PAO We're at 30 seconds away from predicted time of loss of signal.

CAPCOM So long. We'll see you coming around the other side.

SC Roger. Roger.

PAO We've had loss of signal at this time. In that final exchange of conversation between mission control center and Apollo 12, that was Pete Conrad speaking for their all Navy crew. During this front side pass on the fourth revolution, both Pete Conrad and Al Bean transferred to the lunar module checked out the communication system. Their both back in the command module at this time. This was their fourth trip fourth trip during this mission into the lunar module. The next time they transfer it will be for undocking and the lunar landing portion of the mission. We're at 91 hours 13 minutes at present. This is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston. We are about 1 minute away now from reacquiring Apollo 12. Apollo 12 now on it's fifth revolution around the moon. The Apollo 12 crew will shortly be starting a rest period. We're at 91 hours 57 minutes and standing by for acquisition, this is Apollo Control, Houston.

CAPCOM Apollo 12, Houston.

SC Roger Houston, 12, loud and clear.

CAPCOM Very Good. We've got a couple of questions for you. When did you activate the cryopads?

SC When did we activate them? We haven't done it yet.

CAPCOM Okay, if you will let us know, we can track the quantity a little bit better, if we know that. Also we are ready to terminate the battery B recharge.

SC Okay, we will terminate battery B, why don't we go ahead and cycle the pads for you now, we were gonna wait until just before we were gonna go to sleep, but we will cycle them now for you.

CAPCOM Roger, thank you. Also Dick, the boys in the backroom are very well pleased with the B-22 tracking, they were impressed with the technique and the spacing and also the - your solution agrees to within a hundredth degree of the map positions, so everybody is very pleased with that.

CAPCOM Pete, when you go in the LM tomorrow, the AGS people would like you to check a series of locations in the E memory just to check out that system. I've got a list of the locations and the expected perimeters that we would like to read you, sometime before bedtime this evening. They will rest better if you have them tonight.

SC Okay, this is due to what happened on launch is that what you are saying you want to verify from memory.

CAPCOM That is affirmative. I've got the list whenever you want to copy. It is about a page of locations, about 25 or so.

SC Okay, Al's got his hand full of food bags right now. Just a second and I will copy them for him. Way 1.

CAPCOM Roger.

CAPCOM We liked your idea of movies on the fantail so much, that while you were running around there behind the moon this time we replayed your last TV coverage for the boys down in the hanger deck, it was very nice.

SC Very Good.

CAPCOM It looks a lot better on the big screen then it does on my home television set.

SC Well tell you what it looks a lot better from right here with the old eyeball, but we are doing as best as we can for you. I wish we could bring some TV

SC from the back side of the moon - I sure am more impressed with the backside of the moon as being prettier than I am with the front side.

CAPCOM Your making us feel envious.

SC I not sure meets with complete agreement in the spacecraft.

CAPCOM I guess everyone has his favorite spot someplace.

SC Okay, I'll tell you what I'm ready -

CAPCOM Go ahead.

SC I'm ready to copy your AG addresses now.

CAPCOM Roger. Location 454 the value is plus 00700. Location 466 plus 00150. Location 506 plus 02400. 523 is plus all zeros. 527 plus 00500. Location 537 plus 00002 Location 560 plus all zeros. Location 561 plus 02436. Location 564 minus 46314. Location 565 plus 40611. Location 566 plus 01531. 601 minus 75341. Location 602 plus all zeros. 622 plus 00062. Location 634 plus 00100. 654 minus 62655. Location 655 plus 03467. 657 plus 00015. Location 661 plus 00031. Location 662 plus 53603. 666 plus 04140. Location 672 plus 20053. That's the end of the list.

SC Okay, just a second and I will read it back to you.

CAPCOM Roger.

SC Okay address 454 plus 00700. Address 466 plus 00150. 506 plus 02400. 523 plus all zeros. 527 plus 00500. Address 537 plus 00002. Address 560 plus all zeros. 561 plus 02436. 564 minus 46314. Address 566 plus 40611. Address 566 plus 01531. 601 minus 75341. 602 plus all zeros. 622 plus 00062. 634 plus 00100. 654 minus 62655. 655 plus 03467. 657 plus 00015. 661 plus 00031. 662 plus 53603. 666 plus 04140. 672 plus 20053.

CAPCOM Roger on all of them.

SC Okay.

END OF TAPE

SC Okay, we'll check those tomorrow.

CAPCOM Thank you.

CAPCOM Hey, Al, on your TV broadcast when you were commenting about mountains looking like clouds, were you aware that those mountains were in the Sea of Clouds?

SC Nope. I guess that's where it got its name.

CAPCOM We thought you had planned a pun for us.

SC Now that's quite enough of that.

CAPCOM Hey, listen. We've got one idea down here on the O2 consumption rate that we'd like to get your comments on. The suggestion was that last night when you guys were asleep the medibolic rates indicated that one of you was dreaming probably about scuba diving and that we think you were dreaming about petting a moray eel and in the hyperventilation you sucked up too much of the oxygen.

SC Okay, tell David, David, that I'll go along with that one.

CAPCOM Roger.

SC I suspect that it's this chewing device thing. We're just out of the habit of leaving it on to keep it flushed out. It doesn't flush out very well so we've been leaving it on and we usually don't bother to shut it down until the O2 high flow comes on or something and it takes a while. But that probably doesn't account for all of it.

CAPCOM The practical people would be impressed with that. Most of us like the moray eel theory better.

SC Okay, I'll go along with that.

CAPCOM Roger.

PAO That's capsule communicator Don Lind talking interchangeably with Pete Conrad and Al Bean. We're at 92 hours 10 minutes now into the flight and Apollo 12 presently shows an altitude of 65.4 nautical miles above the moon. It's at it's point of apolune at this time.

SC Houston.

PAO This is Apollo Control, Houston, at 92 hours 15 minutes now into the flight. The past few minutes we've had no contact with Apollo 12. We do expect Capcom Don Lind to call them perhaps one or two more times before they bed down for the evening. Their rest period is scheduled to start on this revolution around the moon. Presently we show an apolune of 65.5 nautical miles and a perilune of 54.7 nautical miles for Apollo 12. At 92 hours 16 minutes, this is Apollo Control, Houston.

END OF TAPE

SC Houston, 12.

CAPCOM Go ahead.

SC Will you have one of the doctors look at my biomed and see if it's okay. I had to move one of the leads for some reason. It reacted off my skin and it's all welled up into a bunch of blisters here so I had to move it.

CAPCOM Roger. He reports that it is getting a good signal.

SC Okay. Very good. I'm going back off the air.

CAPCOM Roger.

PAO That last report from the spacecraft was Pete Conrad. We're at 92 hours, 26 minutes into the flight at this time.

PAO This is Apollo Control Houston 92 hours, 38 minutes now into the flight of Apollo 12. We've had no communications with the Apollo 12 crew for the past several minutes. The crew is preparing to start their rest period. We presently show Apollo 12 traveling at a velocity of 5349 feet per second. Current altitude 59.6 nautical miles. Its orbital parameter's 65.5 nautical miles for an apolune and 54.7 nautical miles for a paralune. So at 92 hours, 38 minutes continuing to monitor, this is Apollo Control Houston.

END OF TAPE

PAO This Apollo Control, Houston, at 92 hours and 50 minutes since liftoff. We do not plan to the spacecraft from this point on and will only respond, of course, if they do call Mission Control Center. We're some 20 minutes away from loss of signal. We will continue to monitor any conversation, should a conversation develop between the ground and the spacecraft. Presently, Apollo 12 is at an altitude of 56.5 nautical miles above the lunar surface. This is Apollo Control, Houston.

PAO This is Apollo Control, Houston, at 93 hours 5 minutes now into the flight. We're less than 5 minutes away at this time from scheduled loss of signal. The Mission Control Center has not been contacted by Apollo 12 since our last report nor do we expect to be. Presumably, the Apollo 12 crew has started their rest period, which will be their last period of rest prior to the start of the very active phase of this mission. We're at 93 hours and 6 minutes and currently show Apollo 12 at 54.9 nautical miles above the lunar surface, and this is Apollo Control, Houston.

PAO This is Apollo Control, Houston. We're less than a minute away now from scheduled loss of signal as Apollo 12 will be passing above the far side of the Moon. We're now at 93 hours 9 minutes into the flight, and this is Apollo Control, on.

PAO This is Apollo Control, Houston. We've had loss of signal with Apollo 12. We're now at 93 hours and 10 minutes into the flight.

END OF TAPE

PAO This is Apollo Control, Houston. We're now at 93 hours, 56 minutes into the flight of Apollo 12. We should be acquiring Apollo 12 momentarily, however, since the crew should have started their rest cycle we're uncertain at this point as to whether or not we'll have any communications with them on this the front side pass of the sixth revolution around the moon. However, we will leave the line up in any case. We currently show orbital parameters of 65.2 nautical miles and 55.1 nautical miles. At 93 hours, 57 minutes into the flight this is Apollo Control, Houston.

PAO This is Apollo Control, Houston. We are receiving data at this time from the spacecraft. We're at 93 hours, 58 minutes into the flight.

PAO This is Apollo Control, Houston at 94 hours, 19 minutes now into the flight. We've had no conversation with the Apollo 12 crew since we acquired them. We've still got 49 minutes of acquisition time on this front side pass. It's quite conjectual at this point as to whether or not we will have any contact with them. The Apollo 12 crew is presently in their period of rest. We now show a velocity for Apollo 12 as it circles the moon of 5327 feet per second. Its apalune now 65.2 nautical miles, its perilune now 55 nautical miles. At 94 hours, 20 minutes continuing to monitor, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at Houston at 94 hours, 38 minutes now into the flight of Apollo 12. We have approximately 31 more minutes of acquisition time on this front side pass of the 6th revolution around the moon. Thus far we have had no communication contact with the crew; they are presently in their rest cycle. Following this shift change, we will have a change of shift briefing in the news center with Flight Director Pete Frank. We expect that to start at approximately 9:30. We are now at 94 hours, 38 minutes into the flight, and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69 CST 0908 GET 94:46 244/1

PAO This is Apollo Control Houston at 94 hours 56 minutes into the flight of Apollo 12. We presently show the Apollo 12 velocity at 5370 feet per second. Its apolune 64.8 nautical miles, its perilune 55.1 nautical miles. We have 11 minutes of time remaining before we lose signal with the spacecraft. As you have no doubt surmised by this time, we have not contacted the crew at all during this pass. They're in a rest period. They have not attempted to contact Mission Control Center from the spacecraft. We are, as a reminder, scheduled to have a change of shift news conference scheduled to start at 9:30 this morning, or shortly thereafter. We are 94 hours 58 minutes into the flight, and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/18/69 09:46CST GET 95:24:00 245/1

PAO This is Apollo Control at 95 hours 24 minutes. We're now 29 minutes 43 seconds from reacquiring Apollo 12 Spacecraft at that time will be on it's seventh revolution. We're scheduled to start the change of shift press conference momentarily in the small briefing auditorium in the Houston News Center. Press conference is scheduled to begin at this time. At 95 hours 25 minutes this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 955300, CST 1015 246/1

PAO This is Apollo Control at 95 hours 53 minutes. We are now 1 minute from reacquiring the spacecraft on the 7th revolution, and Mission Control Flight Director Glen Lunney's team of Flight Controllers settled down to watching these spacecraft systems during this scheduled 8-1/2 hours sleep period. We last heard from the crew at 93 hours into the mission, about 3 hours ago. We show an orbital period now of 60 - rather of 1 hour 58 minutes 47 seconds. Our current orbital parameters are 65 nautical miles by 55.1 nautical miles. At 11:00 this morning, there is a briefing scheduled on the Apollo Lunar Surface Experiments Package. That will be held in the main auditorium, the large auditorium of building 1 in the Houston News Center. That's 11:00 A.M. this morning for the briefing on the Apollo Lunar Surface Experiments Package. We'll continue to leave the Air-to-ground circuits up live for any possible conversation with the spacecraft, although we don't anticipate any. We're reading a cabin temperature in the spacecraft, right now, of 65 degrees, cabin pressure is holding steady at the nominal 5 pounds per square inch. At 95 hours 55 minutes this is Apollo Control standing by.

PAO And our network controller reports that we have data from the spacecraft.

END OF TAPE

AFOLLO 12 MISSION COMMENTARY 11/18/69, 10:15 AM CST, GET 95:53:00 247/1

PAO This is Apollo Control at 96 hours, 37 minutes. All continues quiet as the crew moves into their sleep period of about 3 and 1/2 hours now. The spacecraft currently moving towards the site 7, the point at which Apollo 12 is targeted to land, and at the present time we show an altitude of 59.1 nautical miles above the lunar surface. The ALSEP, Apollo Lunar Surface Experiment Package briefing is scheduled to begin at 11 AM in the News Center auditorium, the main auditorium of the Houston News Center. That will be 11 AM this morning for the Apollo Lunar Surface Experiment Package briefing. At 96 hours, 38 minutes this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69 GET 964400 GET 1106 248/1

PAO This is Apollo Control at 97 hours, 3 minutes. We are now some 4 minutes from LOS from Apollo 12. The spacecraft currently on the 7th revolution around the moon. The crew is some 4 hours into a 8 and a half hour sleep period. Here in Mission Control now we have received word from the Solar Particles Alert Network that they have observed a moderate solar flare; this apparently is the same solar flare that we watched on the second of November. The flare has now rotated around and is coming back into the field of view. Based on the previous information that we had from this flare, we would not expect it to be a problem; the particles associated with it were quite low and from our previous information we would not expect to get a significant level of radiation to the crew. We will however be monitoring the particles coming from the flare now over the next few hours, determining the types of radiation levels we can expect for both inside the spacecraft and outside the spacecraft and evaluating this in terms of any possible impact on the mission. To repeat the classification that we have of the flare at this time, based on optical data, is that it is a moderate flare and we would not expect it to be a problem. At 97 hours, 4 minutes into the mission, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 97 hours 52 minutes. We are about 1 minute now from acquiring Apollo 12, the spacecraft on its 8th revolution of the moon, and the crew now some 5 hours into their scheduled 8-1/2 hour rest period. We will continue to leave the circuit open, and should we receive any calls from the crew, although we do not anticipate hearing from them during the rest period. Apollo 12's current orbit is 4.7 by 55.6. We show an altitude at this time of 64.1 nautical miles. We are standing by now for reacquisition in about 15 seconds.

PAO And our network controller reports that we have acquisition of signal now.

SC Houston, Apollo 12.

CAPCOM Apollo 12, Houston. Go ahead.

SC Roger. I've got a couple of quick questions for you. One, we seem to be finding a little more RCS - there seems to be a little more RCS thruster activity around the moon than we had imagined. Is Control satisfied with our propellant usage right now and the number of firings? That's one. Two, I've been getting a little stuffy in the head. In fact, it's been that way since launch. And you know, I don't have a cold or anything. My ears are sometimes clear and sometimes they are not. I took a decongestant pill several hours ago and in order to be sure my ears are good and clear tomorrow for the - all the LM activity and the EVA, how often should I take one of those pills to get the maximum effectiveness from it?

CAPCOM Roger, we'll check on both of those.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM The surgeon recommends that you take one of those every 8 hours, so 8 hours after you took the first one we recommend you take another one, and it should be just about time to take one more just before the EVA, so that is the recommendation. Also, we're interested in getting biomed and we're wondering if you can turn on Pete's biomed. Request you turn the switch. We are not getting any biomed from him and we don't know why. Don't wake him up, but we wondered if you can get us some biomed from him easily.

SC No, he's down in his sleep station and it makes it a bit uncomfortable to get the biomed down to there, so it's not even connected to him. That's why you're not getting it from Pete at all. The only person you've been getting it from is Dick.

CAPCOM Roger. We didn't get any for a long time there. Okay, and on the thrusters, they look good. We're checking further, but at the first approximation things look fine.

SC Sounds good, and I'm going to head back to sleep, Houston, so the only person you'll have biomed on is Dick I guess.

CAPCOM Roger, thank you. Hope your nose clears up.
PAO This is Apollo Control. That was lunar module pilot Al Bean reporting some stuffiness, and he said he did not think he had a cold, and advised that he had taken a decongestant pill a number of hours ago. The flight surgeon recommended that he take another pill approximately 8 hours after taking the first, and then one more just before beginning the lunar landing portion of the mission. Al also questioned us on the propellant usage. He noted that the RCS thrusters seem to be firing regularly in lunar orbit and, as you heard, the advise from CAPCOM Don Lind was that everything looked good with the RCS thrusters and with the propellant usage.

END OF TAPE

PAO This is Apollo Control at 98 hours 26 minutes. We have continued to monitor that solar flare that we reported to you on the last revolution. We have gotten a report from the radiation support room here in Mission Control that the flare would now appear to be classified as a - relatively small one and we've also gotten several other positive indications. One we would have expected by this time, had there been any significant high energy particles to begin receiving some of these at the spacecraft sensors. At the present time we've seen no indication of any radiation - particle radiation in the area of the spacecraft based on onboard instrumentation. Also, we've seen no change in the radiation levels being monitored by the ATSL Satellite which is in its synchronous orbit about the earth, and also no increase in radiation measured by Explorer 41, which is in a high elliptical orbit around Earth that takes it about a third of the way out to the Moon. A short while ago we had a call from the spacecraft, as you heard, Lunar Module Pilot, Al Bean, called down at 97 hours 55 minutes and reported that he had observed regular thruster fire in it and asked us to check the status to see if the spacecraft was, perhaps, consuming more RCS propellant than would be desired. After reviewing the propellant status and the number of Thruster firings, flight controllers reported that all is normal. Just about what we would expect and the propellant usages about what we would expect. Bean also advised that he had some stuffiness and some head stuffiness, nasal congestion. He said he had taken a decongestant pill several hours ago and requested that we provide him with a schedule for continuing to take decongestants up to the lunar landing. The Flight Surgeon recommended that he take an additional decongestant tablet approximately 8 hours after taking the first one and take another one then just before beginning the Power Descent. At 98 hours 28 minutes this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69 GET 984300 CST 1305 251/1

PAO This is Apollo Control at 99 hours, 5 minutes. We have had LOS now. The spacecraft is on the 8th revolution of the moon and the crew is about 2 hours now from their scheduled 8 and a half hour sleep period. During this LOS period we plan to play back the tape recording of the Apollo Lunar Experiment Package Briefing which was held this morning in the Houston News Center. We understand the tape runs about 30 minutes; we expect this LOS period to last something on the order of 45 minutes. We will play back the tape of the ALSEP briefing for you now.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 995200, CST 1414 252/1

PAO This is Apollo Control at 99 hours 52 minutes. We've had acquisition of signal from the spacecraft, now in its ninth revolution of the Moon. We expect the crew will remain sleeping through the major portion of this revolution. They're scheduled to awake at 101 hours, which is a little more than 1 hour from now. At the present time, Apollo 12 is at an altitude of 64 nautical miles above the lunar surface. We show the orbit to be 55.9 nautical miles by 64.4 at the present time. We'll continue to stand by for any conversation from the crew, but as I said, we don't expect anything, probably, for about another hour.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 100:22:00, CST 1414, 253/1

PAO This is Apollo Control at 100 hours 41 minutes. We have a little more than 22 minutes now before loss of signal with the spacecraft. A few minutes prior to LOS, if we have not heard from the crew, we plan to wake them up. The crew will then have breakfast. The lunar module pilot and commander, Al Bean and Pete Conrad will begin putting on their pressure garments, and at about the middle of the 11th revolution, they're scheduled to enter the LM, begin powering up, checking out in preparation for the lunar landing. All spacecraft systems have continued to function normally during the 8 hour sleep period. Several hours ago, Al Bean came on the line to advise that he had a bit of nasal congestion - congestion in the head, and planned to - had taken a decongestant tablet, and planned to continue taking them up to the beginning of the power descent. Bean also checked on propellant consumption, RCS propellant consumption at the time. He reported that he had noted regular firing of the RCS thrusters and wanted to check to see that everything was normal. We advised him that it was. That the thrusters were firing about as often as we would expect them. The propellant consumption was about nominal. At 100 hours 43 minutes, this is Apollo Control. We'll be standing by for the awakening of the crew.

END OF TAPE

PAO This is Apollo Control at 100 hours, 54 minutes Capcom Don Landers preparing to put in a call to the crew shortly. We'll stand by for that. Revielle.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston. Good Morning.
Apollo 12, Apollo 12, this is Houston. Over. Apollo 12,
Apollo 12, Houston. Good Morning.

CAPCOM Apollo 12, Apollo 12, this is Houston.
Good morning, good morning.

SC Good morning, Houston. This is 12.

CAPCOM Good morning, gentlemen, today is the
big day. Hit the deck.

SC Roger. We've been there for awhile.

CACPCOM Very good. We've got a couple of items
for you when you get your eyes wide open.

SC Okay, I'm ready to copy.

CAPCOM Question about your biomedical sensor
that you reported moving the other day. Is it still holding
in position?

SC Yes. I want to talk to about that this
morning. Go ahead with the rest of the questions, then I'll
talk to you about it.

CAPCOM Okay. That was one of them. One of the
other items was that while you were sleeping, we've had a
class 2 flare reported on the sign. We watched it very
carefully in your behalf and we get no particles coming out
of it in the vicinity of the earth, so we exercised the system
but there's nothing to report coming your way. The surgeon
is recommending -

SC Okay.

CAPCOM The surgeon is recommending that we change
your biomedical sensor, but what do you have to say about
first?

SC I've already moved the sensor and I am
developing a little bit of a problem with all of them as
never had this problem before but something in that dew is
alergic - my skin is allergic to it I guess and I finally had
to move the upper one because it broke out underneath it
and I guess I was weeping plasma or something and it finally
started weeping over the sides. It's been bothering me for
the last couple of days. All of them are in the same category.
(Static) I'm beginning to break out even worse now. One on
my chest is pretty bad. I moved that one. So, what I propose
to you all is that I am going to leave them just the
way they are until we get all the way through the EVA and
I get back up here, then I want to take them off.

CAPCOM Apollo 12, go manual on the high gain.

CAPCOM Apollo 12, Houston. Manual high gain losing
your signal.

CAPCOM Apollo 12.

SC Okay, Houston, I'm on OMNI B. How's
that?

CAPCOM Roger. Much better. We lost most of your transmission about your biomed sensors, Pete, you said you have been having trouble for about a day or so. What was the last half of that message?

SC Okay. What the problem is for some reason it is making me break out. It looks like I've got poison ivy under those things. They are weeping plasma or whatever you weep and the one I moved is the one on the top of my chest and it's all broken out up there and I don't want to take the rest of them off because I am afraid that I am going to find underneath so what I propose to do is to continue the way they are and when we get done EVA's down there, I want to get rid of them. They are driving me buggy.

CAPCOM Roger. We are going to talk that over for a second. We are about two minutes from LOS. Just in case we should lose you a little bit early, we expect to pick you up again at 101 plus 49.

SC Roger. Okay, I've already moved that one and my skin is in pretty bad shape underneath it. It's still weeping whatever you weep, plasma, I guess, and I don't want to move the other one.

CAPCOM Roger. Just a question on that. When you moved it, did you put on a new seal and new jelly?

SC That's affirmative.

CAPCOM Very good.

SC I think we are getting ready to lose you here, Houston. We'll see you on the other side at 101 49.

CAPCOM Roger.

CAPCOM Apollo 12, Houston.

SC Roger, roger.

PAO This is Apollo Control at 101 hours, 4 minutes. We've had loss of signal now from the spacecraft. We'll reacquire again at 101 hours, 49 minutes or a little more than 45 minutes from now. At that time the spacecraft will be in its 10th revolution of the moon. During that exchange with the crew, Pete Conrad reported that one of the biomedical sensors attached to his chest had been giving him trouble. As you heard, he said that apparently some sort of allergic reaction to the jelly that's used to attach the sensor and he had broken out underneath it. We're evaluating the situation with respect to the sensors at the present time and plan to have some sort of recommendation to pass up to Conrad when we reacquire. At 101 hours, 5 minutes, this is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control at 101 hours, 48 minutes. Apollo 12 now in the tenth revolution of the moon. We are coming up on 1 minute, 45 seconds until we reacquire the spacecraft. During this revolution we will be talking to the crew concerning their crew status report. We will have some further conversations with Pete Conrad about the bio-medical sensors and the irritation that he reported on the last revolution - the irritation associated with the location where the sensors are attached to his skin. The crew is also scheduled to eat breakfast during this revolution. There will be some housekeeping type activities aboard the command module. Early on REV 11, Dick Gordon is scheduled to don his space suit. A little later on Pete Conrad and Al Bean will also begin donning their space suits - in the eleventh revolution and they are scheduled to enter the lunar module about midway through the eleventh rev and begin following up and checking out the LM. We are now 35 seconds from reacquire. We'll stand by for acquisition.

CAPCOM Apollo 12. Houston. How do you read?

S/C Hello Houston. 12 reads you loud and clear. How me?

CAPCOM Roger, Pete. We are reading you loud and clear.

CAPCOM Apollo 12. Houston. On your biomed sensors situation, we have a few words for you if you are ready.

S/C Go ahead.

CAPCOM Okay. Recommendations of the medical people here are that you remove the two side - the respiration sensors. You can go ahead and take those off completely and treat the areas with your first aid cream and if they are weeping you can go ahead and cover them with a band-aid or something. The ones on the blue lead - they recommend you do the same thing with those - remove them, cover them with first aid cream, and put a band-aid on them if they are weeping and then relocate those with a whole brand new system and that way you will have a good clean system with a minimal chance itching beginning immediately in a new area and, of course, if you don't like this particular proposal they have no objection to you sticking to the way you wanted to do it of just leaving it where it is.

S/C Jerry, just ah - I want to stick with it the way it is. It works. The respiration leads on my sides are the least ones that are bothering me. I moved the one that bothered me the most and the best I could describe that area is that it looks like I've got a 1-inch round patch of very bad poison ivy. The rest of them aren't anywhere near that bad. They have been bothering me but they work and I would just as soon leave them where they are because the area that

S/C I moved is raw and I have covered it with a band-aid but I am a little worried about getting my sides exposed even with band-aids with that LCG on. I think that the sensors themselves will be better protection just the way it is and when I get back up I'll take them all off and switch them around.

CAPCOM Okay, Pete. That's fine. We are satisfied with that if that is the way you would like to do it.

S/C Yeah, you are getting good data now aren't you?

CAPCOM Roger. Looks very good Pete.

S/C Okay. I would just like to leave it the way it is. Let me give you the sleep report. Everybody had 7 hours across the board and the PRD's were from Commander through LMP 11016, 11015, 04017. The check list has been complete. We dumped the water to 10 percent. We purged the fuel cells. We cycled the fans, and we are just finishing up breakfast right now.

CAPCOM Roger, Pete. Sounds good. We would like to get a little more medical information from you if we can. First of all, we want to get a little more word on how Al is doing with his stuffiness and has anybody else suffering from any stuffiness.

S/C That's negative and I'll let you - nobody else is stuffy - and I'll let you talk to Al direct.

CAPCOM Okay.

S/C I've had a pretty stuffy - Houston - I've had a pretty stuffy head ever since we got into orbit and I assumed it was going to go away in a couple of days but it never did. I don't sneeze, cough, or have any other symptoms. It just seems to be fairly full in the ears and the nose. I tried a couple of decongestants. They work well but I didn't know exactly how far apart to take them. Right now my ears are clear and my nose feels real well. I have taken two of the pills, 8 hours apart, and I have been using the sprays, so it looks like we have got it licked right now.

CAPCOM Okay, Al. That was what we were going to suggest is that you take your pills 8 hours apart and use the spray and we just hope that takes care of it for you. Next question we had from the medical people is how did you guys sleep? Did you get 7 good solid hours or was there any fitfulness at all?

S/C We are all sleeping real well up here. As a matter of fact, we overslept, I think.

CAPCOM That's great.

S/C I'll tell you it's a real switch from Gemini. I never slept at all in that thing but I crawled down there in that lower - underneath the couch - and just disappear

S/C for 8 hours.

CAPCOM Roger. The doctors say that you ought to space your actifeds every 6 hours now instead of 8.

S/C Roger. How often can you use that spray, I kind of wondered that too.

CAPCOM Al, use that about 3 to 4 hours. If you can space it to 4 - fine. If you need it, go ahead and use it every 3 hours.

CAPCOM Okay. We'll don't have to worry. It's real clear now and it stays clear as long as I use the pills and things - so it looks good for the rest of the trip.

CAPCOM That sounds fine, Al.

S/C I don't think he's had anything. It seems to us - we have all kicked it around a little bit - more like maybe there may be a little bit of dust floating around in here or something, that may be just making it stuffy. It is a little bit different than being on the ground. He is not allergic to anything on the ground but that is what it appears to be.

CAPCOM Roger, Pete. Is Al putting on his LCG now? His biomed doesn't look too dandy.

S/C No, he is just laying here eating breakfast. We'll smarten him up before he gets in it.

CAPCOM Roger.

S/C Okay and we need our CSM consumables if you'll pass it to us please.

CAPCOM Okay. We're working on that. While you are waiting I've got a flight plan update for you on the FRA MAURO pictures and also your REV 11 map update.

S/C Ready to copy. Go ahead.

CAPCOM Roger. While you are copying, give us (garble) and ACCEPT and we have some uplinks for you. First flight plan update is FRA MAURO photos.

S/C You got it.

CAPCOM Tango 1 is 1023026. Tango 2 is 1023227. Tango charley alpha is 1023258. The optimum position in the window will come at 1023139. Over.

END OF TAPE

CAPCOM 258. The optimum position in the window will come at 102 31 39. Over.

SC Roger. G1 102 30 26. G2 is 102 32 32.
PCA is 102 32 58. Optimum 102 31 39.

CAPCOM Roger, Dick. Your comm just improved. You must have moved your mike closer to your mouth. Flight plan update for REV 11. REV 11 map update, LOS 103 02 01 103 26 34 103 47 44.

SC Roger, copy.

CAPCOM Okay, and I have your CSM consummables update if you're ready to copy.

SC Go ahead.

CAPCOM Okay. GET is 101 plus 00, RCS total 69 point 2, ALPHA 68 point 5, BRAVO 71 point 8, CHARLIE 66 point 9, DELTA 69 point 6. Hydrogen is 64 point 4 and 61 point 5. Oxygen is 63 point 6 and 65 point 7. Over.

SC Roger, copied.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Roger. Before you slipped into the pad last night, we didn't get your on board readouts. We need your PYRO batteries and your BAT C readouts.

SC Jerry, all the batteries, battery C, PYRO bat A, PYRO bat B, all read 7 point 1.

CAPCOM Roger, copy three 7 point 1.

SC That's CHARLIE.

CAPCOM Thank you, Dick.

CAPCOM Apollo 12, Houston. The computer is yours. You've got a new state VECTOR and a new REFSMAT.

SC Roger.

PAO Astronaut Jerry Carr is our capsule communicator at this time having relieved Astronaut Don Lind in that position.

SC Hello Houston, 12.

CAPCOM Go ahead, 12.

SC (Garbled)

CAPCOM 12, Houston. Did you ask about option 1 on your P52?

SC That's affirmative.

CAPCOM That's affirmative, 12, option 1.

SC Okay.

SC Say, Houston, did our orbit decay last night like it was supposed to?

CAPCOM 12, Houston. Affirmative and we're getting good comparisons within a 100 feet.

SC Good show.

CAPCOM Roger. These are down range comparisons.

SC Understand. I guess if Dick nails that 193 like or 191 like you did the other one last night, the only excuse

SC will be mine if we don't make it.
CAPCOM Roger, Pete.
CAPCOM Apollo 12, Houston.
SC Go ahead, Jer.
CAPCOM Roger. Your S-band communications on the previous two REVS haven't been too sterling. We've had a couple of cases where your signal strength has dropped off and then come back up again. We'd like to do the rest of this pass, using your secondary servo electronics and see if that doesn't avoid the problem again. Now what you'll have to do is take your TRACK mode and go to MANUAL with that and then your servo electronics to SECONDARY and then re-acquire. Over.
SC Roger, roger.
SC Houston, 12. How do you read?
CAPCOM 12, Houston, loud and clear.
SC Okay we've switched to SECONDARY. I noticed - I was watching it just before we went around the horn on the last pass and when we were within 6 - 7 minutes of LOS, the antenna just started rising itself and the signal strain started falling off. The antenna was sort of wandering around. Now, whether that would be the electronics or perhaps some something else that's influencing the antenna. We'll look for it again on this pass.
CAPCOM Roger. I guess that's about what we're thinking, Pete, that's why we recommended your SECONDARY servo electronics.

END OF TAPE

CAPCOM Apollo 12, Houston. I have a DAP pad and a TEI-34 pad for you.
SC Okay. Just a second, Houston. Okay. Go ahead, Houston.
CAPCOM Roger. CSM DAP load, this is for LOPC No. 1, or for rescue. The CSM weight is 36786, PITCH minus .78, YAW plus .43. Over.
SC Roger. Copy for the pray change or rescue weight 36786, LM minus .78 plus .43.
CAPCOM Affirmative. TEI 34 follows. Maneuver pad SPS G&N. The weight is 36000, NOUN 48 minus 070 plus 033, NOUN 33, 150444852, NOUN 81 plus 31186 plus 04091 minus 01313, ROLL NA, PITCH 136, YAW NA. The rest of the pad is NA. Your ullage is 4 jets 11 seconds. Over.
SC Roger. SPS G&N 36000 minus 070, plus 033, 150444851, plus 31186 plus 04091 minus 01313, NA 136, NA 4 jets, 11 seconds.
CAPCOM Affirmative.
SC What's going on down there in the world today, Jer.
CAPCOM Gee, I don't know, Pete, I just got here myself. We'll have a news brief for you real shortly.
SC Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/18/69,GET 102:18:00,CST 1640,258/1

CAPCOM Apollo 12, Houston. I've got news for you now or would you rather wait until after the photos?

SC We're pretty busy right now. We'll give you a call back.

CAPCOM Okay.

SC Okay, Houston. We just changed out the LIOH canister per flight plan and we're ready for the news.

CAPCOM Okay, Pete. News coverage on your flight is beginning to pick up as the touchdown gets a little closer here. I guess most of the reports right now are about your medical ailments. Your "code in de node" and all that stuff. Joseph P. Kennedy died peacefully today without regaining consciousness from a heart attack. In the Senate today, the vote for the confirmation of Judge Haynesworth has been tentatively set for noon, Friday. On the stock market business world, the stock market dropped six points yesterday and rebounded a little bit today with the averages up about 2.64. In international news, the United States and the Soviet Union met yesterday in Finland for what President Nixon called momentous negotiations to seek agreement on ways to limit production on their arsenals of war. In local news, the University of Houston accepted a bid to play Auburn in the Astro Blue Bonnet Bowl on New Years' Day. In the weather world, the weather here in Houston is really miserable. We've had showers most of the day. The temperature started out early this morning at fairly warm and has been plummeting all day, and it's in the low 50's right now. I got a little piece out of the Houston Post that gives the Bowl games at a glance. The Rose Bowl game looks like it's going to be deciding who's going to play in it this next weekend. It's either going to be Southern Cal or UCLA and they'll be playing either Michigan or Purdue. In the Rose - in the Orange Bowl, it's settled out now with Penn State playing Missouri. In the Cotton Bowl, Notre Dame has accepted a bid to the Cotton Bowl, and they're going to be either playing Texas or Arkansas, whoever wins that game. I think it's December the 6th. In the Sugar Bowl in New Orleans, it'll be Mississippi versus whoever loses the Texas-Arkansas game. In the Blue Bonnet Bowl, I gave you that one already. The Peach Bowl will be South Carolina and they haven't picked a team to play them yet. In the Gator Bowl, it'll be Tennessee versus Florida. In the Tangerine Bowl, Davidson versus Toledo, and in the Sun Bowl, Georgia is going to play Nebraska. That pretty well covers some of the more important bowls.

SC Roger. I'd still like to square something away down there. Al doesn't have a cold and all I have is a one inch itch and I don't consider that any big major medical problems. As a matter of fact, we're in pretty damn good shape.

CAPCOM Roger, Pete.

CAPCOM 12, Houston. Al's biomed still looks a little ratty.

SC Okay. We'll spike him up here. We're just getting into the LCG's and stuff now, and I mean we're just getting them out of stowage and everything and we'll work him over and see if we can't clean him up. He may have a loose lead. He's been in and out of his harness a couple of times during the night.

CAPCOM Okay. It looks like a loose lead down here. Give us a call when you've got him adjusted and we'll tell you how it looks.

SC Those leads look pretty tight now. How's it look down there?

CAPCOM Standby and we'll take a look at it. No, it's still looking pretty squirrely, Pete.

SC Okay.

END OF TAPE

SC Hello Houston, 12.
CAPCOM 12, Houston, go.
SC Roger. You can tell good Dr. Schmitt to relax,
we got his pictures.
CAPCOM Roger. He'll be tickled to hear that.
SC You can tell him to relax till he sees them, that
is.
CAPCOM Roger. They look pretty good, huh?
SC Let's put it this way, let's say they're
going to be very interesting.
CAPCOM Roger, copy.
PAO That was Pete Conrad reporting that they had
gotten the photographs of Fra Mauro, the proposed landing
site for Apollo 13, which will be commanded by Astronaut
Jim Lovell.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Roger. Got some words from the families,
Dick I just talked to Barbara and she's been resting up,
they're taking naps and everything getting all set for
spending the night up with you and Barbara said to tell you
that she thinks you're just great.
SC Well, tell her thank you after 16 years, it's
about time.
CAPCOM (laughter) Pete are you listening?
SC Negative, Jer, they're (garbled)
CAPCOM Okay, when they get back up on the hook, give
me a call.
SC Okay, we'll have them check in as soon as
they come up.
CAPCOM Okay.
SC And I'm doing the maneuver for the 10250
right now, Jerry.
CAPCOM Roger, copy.
SC Hello Houston, 12. Pete's back up on the line.
CAPCOM Okay, Pete, talked to Jane just a few minutes
ago and she said the family's all doing fine and they're -
SC Hold it a minute.
CAPCOM Say again.
SC Okay, go.
CAPCOM Roger, Pete, just talked to Jane a few minutes
ago. She said the family's all doing just fine and they're
all getting rested up to spend the night up watching you
guys.
SC Very good, Jer, thank you. Can we have the
doctors look at the biomed on MILCG now all hooked up.
CAPCOM Your biomed looks real good.
SC Okay, now I just had a little discussion with
Al and we want you to look at his biomed as soon as he comes
back up. All his sensors are on good and all his connections
are tight and we prefer not to get into a game of swap the

SC amplifiers or anything cause those things
aren't too great.

CAPCOM That's affirmative. We agree with that too,
Pete.

SC Okay, we'll be back up in a minute.

CAPCOM Okay.

SC Houston, this is Al, go ahead and check my
biomed now.

CAPCOM 12, Houston. Al, you're still looking noisy.
It looks just like a loose connection. Don't really know what
you could do more than just tighten them up.

SC We've tightened both the top and bottom ones
several times. I think maybe that's just the way it's going
to be.

CAPCOM Al, did you look under your sensors to see
they were dry and - really pick them off and look at them
or did you just kind of punch them on?

SC Well, I haven't had any trouble with the
sensors, they might be -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1024300, CST 1705 260/1

CAPCOM - really pick them off and look at them or did you kind of punch them on?

SC Well, I haven't had any trouble with the sensors. They might be dry. I didn't look under them at all, just checked the connections like you requested.

CAPCOM Roger.

CAPCOM 12, Houston. We are about 1 minute from a handover from Goldstone. There may be an interruption there.

SC Okay.

CAPCOM Apollo 12, Houston.

SC GO, Houston.

CAPCOM Roger. Al's biomed looks pretty bad there. The medical people suggested that you try on one of your sensors, try a new seal and some new paste under it. We'll see what that does.

SC Which one?

CAPCOM Pick the top one, that will be okay.

SC Okay.

CAPCOM Al, while you are cutting and pasting there, are you listening?

SC He's not listening. Go ahead. What do you need?

CAPCOM I was just going to pass up some words from Sue when he listens next time.

SC Okay. We'll get him on the line after while.

SC Hello, Houston. Are you looking at the DSKY - (Inaudible).

CAPCOM Roger. We copied your star angle.

SC Do you have those?

CAPCOM Sure do, Dick. It's pretty good for on the job training.

SC You weren't supposed to say that out loud. Okay. I'll pardon you this time.

CAPCOM Roger.

SC Jerry. This platform has done real well in spite of that glitch we gave it at launch.

CAPCOM Roger, Dick. You recommend that we glitch them like that every time?

SC No, sir. Not at all.

SC Okay, Houston. How about looking at Al now. We changed one sensor out. Everything looks good.

CAPCOM Roger, Pete. Stand by.

END OF TAPE

CAPCOM 12, Houston. You can work on that lower sensor now. We'd like you to get them both if you can. If you can only do one, do the lower sensor and we'd like to have a look at you before you go LOS in 8 minutes and 45 seconds.

PAO This is Apollo Control. We have about 7 and a half minutes now until Loss of Signal. We plan to have a Change of Shift Briefing in the Houston News Center at about 5:30 this afternoon, Central Standard Time.

SC Okay, Houston. How does the bio-med look now?

CAPCOM 12, Houston. It's a little bit improved. What did you do that time?

SC Just what you said. Change the lower one out.

CAPCOM It seems to be improving now, Pete. I guess we'll just have to live with what we can get here.

SC There you go. Afterwards I want to hear we're on our way. Bye, bye.

CAPCOM Roger.

SC Go Houston.

CAPCOM Roger. Like to have you paste up that third bio-med sensor and that'll be the end of the fooling around with it.

SC What third one? The one on the top?

CAPCOM That's affirmative.

SC Okay.

CAPCOM Al, you listening?

SC (garble)

CAPCOM Okay Al. I talked to Sue a little while ago and they're also doing fine at home. They're resting up getting ready for tonight.

SC Stand by. Stand by.

CAPCOM Okay.

SC Houston, I think we solved the problem. The one that we just pulled off on the top is all dried out.

CAPCOM Roger. They're rejoicing in the streets here.

CAPCOM Apollo 12, Houston. One minute from LOS and things are all looking good now and we'll see you at 103 47. Over.

SC Roger. 103 47.

PAO This is Apollo Control. We've had loss of signal now on the 10th revolution. We'll be reacquiring Apollo 12 in 45 minutes 48 seconds on the 11th Rev. The Change of Shift Press Conference is scheduled to occur shortly after 5:30 in the News Center, Building 1. At 103 hours 2 minutes, this is Apollo Control Houston.
END OF TAPE

PAO 56 minutes ground elapsed time. Apollo 12 has come around the front side of the Moon on the eleventh revolution, we had acquisition of signal at 103:47, about 9 minutes ago. Al Bean has moved into the lunar module, Intrepid. He went in at 103:40 about 17 minutes ago. We have an accumulation of tape, a few seconds of tape actually, that built up during the time that the change of shift press briefing was underway in building 1. We'll roll that tape now and join the subsequent conversation during this pass across the face of the Moon, as we play back the tape, after the tape is complete.

CAPCOM is 106 54 -

CAPCOM 06 24 54 106 29 59, SOURH 18. Over.

SC Roger. Copy. T1 106 24 54, T2 106 29 59, SOUTH 18.

CAPCOM Affirmative, Dick.

SC Okay, our status is pretty good right now.

Al's over in the LM. He's been over there for about 10 minutes. We've got everything rigged in the command module. Pete's getting on his PGA and as soon as he does that, we'll be right back in business.

CAPCOM Roger, Dick.

CAPCOM 12, Houston. When you get to it, we need a docking tunnel angle.

SC Roger, Jerry. It should be there in the records we called it down twice it's still the same. Negative point 3. Over.

CAPCOM Okay, still hasn't changed. Thank you.

SC Better not with all 12 of those legends made.

SC Where'd you set your clock, Al?

SC Houston, Intrepid.

CAPCOM Intrepid, Houston, go.

SC Roger. I'm down in the LM now. Everything is ship shape. I just pulled back the window shades and both of the windows are well frosted over. Guess we'll turn on the heaters when we power up in about 4 or 5 minutes.

CAPCOM Roger, Al and we're reading you nice and clear.

SC Roger, I'm on CSM still.

PAO This is Apollo Control. That completes the few seconds of tape of the beginning of the eleventh lunar revolution. We'll leave the circuit live for the balance of this revolution which ends in 1 hour and 13 seconds. Staying up live on air to ground circuit.

SC Houston, Apollo 12.

CAPCOM 12, Houston, go.

SC Okay, I'm all suited and I'm on the CSM system. Will you take a look at the biomed and everything. How does that look?

CAPCOM Roger. Doctor says it looks very good.

APOLLO 12 MISSION COMMENTARY 11/18/69 CST 18:19 GET 103:56 262/2

SC Okay.
SC Houston, Intrepid. On the LM S-band. How
do you hear?
CAPCOM Intrepid, this is Houston. Reading you
slightly weaker than normal and fairly clear.
SC Roger.
CAPCOM Intrepid, Houston, we're copying your low
bit rate.
SC Roger.
SC Also, Houston, my systems engineering (garbled)
voltage now is 26 point 9.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 104:07:00, CST 1829, 263/1

SC Also, Houston, I (garbled) engineering
(garbled) 26.9. (garbled)
CAPCOM Understand. Your ST (garbled) 26.9.
SC (garbled) is 28.
CAPCOM Intrepid, Houston. You're very difficult
to read. Did you say commander thrust 28?
INTREPID (garbled)
CAPCOM Roger. Standby, Al. Intrepid, Houston.
Affirmative. You can go to high tap now.
INTREPID Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 104:17:00, CST 1839, 264/1

INTREPID Houston, Intrepid.

CAPCOM Intrepid, Houston. Weak, but clear. Go.

INTREPID Roger. We came on LM power 104:00:00.

(garbled)

CAPCOM Roger. Copy. LM power 104:00:00.

INTREPID Houston, Intrepid. We're going to go over one of the secondary S-band circuitry now. Over.

CAPCOM Roger, Intrepid.

INTREPID Houston, Intrepid. On secondary transmitter, receiver power now.

CAPCOM Intrepid, Houston. We're reading you weak with heavy background noise.

INTREPID Roger. We're going back to primary.

CAPCOM Roger, Al.

INTREPID Hello, Houston. CDR on Intrepid. How do you read?

CAPCOM CDR, Intrepid. This is Houston. Reading you weak with heavy background noise.

INTREPID Roger. Roger. We're going ahead with tape turn-on itself test.

CAPCOM Roger, Pete.

CAPCOM Intrepid, Houston. You dumped your background noise. We copy on S-band antenna.

INTREPID Okay, Houston. I just did mode 35 enter, and right after I did it, I got a program alarm 12.

CAPCOM Intrepid, Houston. That's expected. No problems. Press on.

INTREPID Okay.

END OF TAPE

YANKEE CLIPPER Okay, Houston, the computer got through
self check, okay?
CAPCOM Roger, Pete.
INTREPID How do you read, Yankee Clipper?
Intrepid on VHF-B.
YANKEE CLIPPER Intrepid, Yankee Clipper, loud and
clear.
INTREPID How do you read me, Yankee Clipper?
YANKEE CLIPPER Loud and clear.
INTREPID Okay, let's go to simplex A.
YANKEE CLIPPER Roger. Simplex A.
YANKEE CLIPPER Okay, Yankee Clipper, how do you read
simplex A.?
INTREPID Loud and clear.
YANKEE CLIPPER Roger. Give me a CSM 9 from your
computer, please.
INTREPID Okay. It's 104 35, 34 -
YANKEE CLIPPER No, no, no. Give me one of the future.
INTREPID Okay, set it up for 104, 36. That's in
15 seconds. Can you make it?
INTREPID 5 seconds, 4, 3, 2, 1, MARK. 10436.
YANKEE CLIPPER Okay. Now, let's get a 0665 going.
INTREPID Okay. Go ahead.
YANKEE CLIPPER Okay. On my MARK, we'll set the time.
4,3,2,1 MARK.
INTREPID Roger. I got 10436, 20 41.
YANKEE CLIPPER They are only off by .82 seconds. That's
not bad.
INTREPID Want to give another check?
YANKEE CLIPPER Okay, let's try one more time.
INTREPID Okay.
YANKEE CLIPPER On my MARK, we'll take the time.
3,2,1 MARK.
INTREPID I've got 104 37 21 68.
YANKEE CLIPPER Okay. I've got 2172. Very close.
That's good enough. Now, give me your GSM, please.
INTREPID Roger. R ones reads four balls four,
1461613744.
YANKEE CLIPPER Okay. Four balls four, 1361613744.
INTREPID Roger.
INTREPID Hello, Houston, how do you read
Intrepid. Are you ready for the E-memory dump?
CAPCOM Intrepid, Houston. Reading you loud
and clear, ready for the dump.
INTREPID It's on its way.
CAPCOM Roger, Pete.

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1042200, CST 1854 265/2

INTREPID Okay, Dick, I'm ready for you at the
GO to middeadband attitude hold and give me a gimbal angle.
INTREPID Did you got me, Yankee Clipper?
YANKEE CLIPPER Okay, Pete. My throttle 1 is 24014
my two is 27100 and our 3 is 35938.
INTREPID Say the last one again.
YANKEE CLIPPER 35938.
INTREPID Hey, Houston, are you doing your
mathematics on the ground. Check these gimbal angles.
CAPCOM Roger, Pete, we're working.
INTREPID We're going to try to check the
ascent batteries right now.
CAPCOM Roger.
INTREPID Okay, Yankee Clipper, Intrepid. You
no longer have to hold your attitude. Take deadband.
YANKEE CLIPPER Okay, Pete. I'm ready for a verbal
6, NOUN 20 anytime.
INTREPID Okay, Yankee Clipper, on my MARK
let's get an 0620. 4,3,2,1 MARK
YANKEE CLIPPER Houston, Yankee Clipper.
CAPCOM Clipper, Houston, GO.
YANKEE CLIPPER Our one reads plus 23967, our 2,
plus 27154, our 3 plus 35917. Over.
CAPCOM Roger, Yankee Clipper. Go ahead,
Intrepid.
INTREPID Roger. Plus 05999 plus 09118 plus
00058
CAPCOM Roger. What's you GET?
INTREPID 1044510.
CAPCOM Roger, copy. 1044510, Yankee Clipper
plus 23967 plus 27154, plus 35917. Intrepid plus 05999
plus 09118 plus 00058.
YANKEE CLIPPER That's the charlie here and would
you verify that guidance is happy with step 1 throu 7 there
on act 30 and 31 and all flags are set.
CAPCOM Roger.

END OF TAPE

S/C That guidance is happy with steps 1 through 7 there on AGS 30 and 31 and all the flags are get.
CAPCOM Roger, they are all very happy.
S/C Houston, Intrepid EV BAT voltage is 37.5 for both BAT A and BAT B.
CAPCOM Roger, Intrepid.
S/C Hey, Houston, do you have any objections to my lowering the gear down?
CAPCOM Negative, Intrepid. Go ahead.
S/C Okay, lower the gear. They probably won't be able to see it. It is as dark as blazes out there but go ahead.
S/C Any doubt about that?
CAPCOM It looks good down here, Pete.
S/C Okay, Houston. The gear is down and locked.
CAPCOM Roger, 12.
S/C Let's see if you can do it like the SIMS and get me back up my IMU final eye.
CAPCOM Roger.
S/C Okay, Houston. We are bringing the AGS up at this time.
CAPCOM Roger, 12.
CAPCOM Intrepid, Houston. Will you (garble) your torque angles.
S/C Roger, Houston. Ready to copy.
CAPCOM Roger. Outer, Minus 00250, Inner, minus 00360. Middle, plus, 00050.
S/C Okay, that was X minus 00250, Y minus 00360, Z plus 00050.
CAPCOM That's affirmative, Pete.
S/C Houston. How long to LOS?
CAPCOM Intrepid, Houston. LOS in 7 plus 20.
S/C Okay, we will give you your first set of 0620's if you want them.
CAPCOM Intrepid, Houston. They won't help us much but we will take them anyhow.
S/C Okay, forget it. Have you got ADAPT data code, LM weight, and CSM weights for me.
CAPCOM Intrepid, Houston. Those are inwork.
CAPCOM Intrepid, Houston. If you will give us 2 in data, we will get your REFSMMAT up early.
S/C Roger. You got 2 in data.
CAPCOM Roger, Pete. I've got your LM and CSM weights for you when you are ready to copy.
S/C Go ahead.

CAPCOM Roger, LM weight - 33730. CSM weight -
36786. Over.
INTREPID Okay. LM weight - 33730. 36786.
CAPCOM Affirmative, Pete.
CAPCOM Intrepid, Houston. The computer is yours.
INTREPID Roger.
INTREPID Houston. Intrepid.
CAPCOM Intrepid, Houston. Go.
INTREPID Roger. The drogue is in. The probe is
in and our hatch is closed and we are over on Intrepid ECS.
CAPCOM Roger.
CAPCOM Intrepid, Houston. You are 1 minute from
LOS and just a reminder - don't do a VERB 47 on the back side
or you will be integrating for a long time.
INTREPID Understand, Houston. The LMP, of course,
is back in and we are going to press with everything that doesn't
need MSFN.

CAPCOM Roger. Go on Clipper.
CAPCOM Yankee Clipper, Intrepid - Houston.
Looking for you at 10545.
PAO This is Apollo Control We have had loss
of signal with both vehicles. As the Apollo 12 spacecraft
went over the hill, midway through the 11th revolution, the
crew had gained some time on the flight plan time line. They
lowered the landing gear about an hour ahead of time, verified
the drogue and probe were in place, and went on the Lm
environmental control system almost an hour early. Some other
numbers that are being generated now for the nights activity.
These numbers are likely to change somewhat undocking 108 2442.
Descent orbit insertion 109 2338. Power descent initiation
110 hours, 20 minutes, 35 secones. The power descent
initiation will be the final phase from 8 nautical miles altitude
and some 260 nautical miles uprange from landing site 7. This
so called high gate 7,000 feet will come in about 8 minutes,
30 seconds after ignition. The PDI maneuver and low gate about
100 feet, some 10 minutes, 54 seconds, with touchdown at
ground elapsed time of 110 hours, 31 minutes, 58 seconds.
Coordinance that have been feeding into the LM guidance
computer for the surveyor site - as soon as the commentator
locates his notes - 2,9903 south latitude. 23,4031 west
longitude. We have some 43 minutes, 30 seconds remaining
until acquisition of signal on the 12th revolution, as Yankee
Clipper and Intrepid come around front side again and at
105 hours, 2 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo control at 105 hours 45 minutes in ground elapsed time. Some 40 seconds away from acquisition of both vehicles as they come around the corner on the 12th revolution. During this pass, there will be quite a few activities related to preparing the lunar module, Intrepid for the landing early tomorrow morning. At - during the last revolution the crew of the Intrepid had gained quite a bit of time on the flight plan in doing a lot of these chores. Among the items to be passed up to the crew will be the so called PADS for the maneuvers times - ignition times so on, DELTA V's. We've had acquisition signal on both vehicles. Standing by for that first call.

CAPCOM - Houston. Over.
 YANKEE CLIPPER Hello, Houston. Clipper here.
 CAPCOM Roger, Clipper. Give us P00 and accept and we'll start your state vector up.
 YANKEE CLIPPER About a 6 21st.
 CAPCOM Okay, fine.
 YANKEE CLIPPER Pete, you ready?
 INTREPID Yes sir (garbled). 5 4 3 2 1 MARK.
 YANKEE CLIPPER Houston, are you ready to copy?
 CAPCOM Roger. Go ahead.
 YANKEE CLIPPER Hey, Yankee Clipper, R1 reads 23961. R2 reads 27186. R3 reads 35952.
 CAPCOM Roger, Clipper. Go ahead, Intrepid.
 INTREPID Roger. R1 reads 06008 09189 00047 and the time was 105:47:12.
 CAPCOM Roger. At 105:47:12 CSM plus 23961 plus 27186 plus 35952. Intrepid plus 06008 plus 09189 plus 00047.
 INTREPID Intrepid, that's affirmative and we're ready to go to P00 and data.
 CAPCOM Okay. We want to pump one up to Dick, first.
 YANKEE CLIPPER Okay. pump one up to Dick. While you're doing that I did the rate gyro jet, unpressurized the RCS system. Pressurized okay the helium pressures are 2900 and 2900.
 CAPCOM Roger, Intrepid. They're looking good.
 INTREPID Okay, you guys ready for the DAP SET gimbal and throttle test?
 CAPCOM Affirmative. Go ahead.
 INTREPID Okay. It'll be coming to you in a minute.
 CAPCOM Yankee Clipper and Intrepid, I have your undock and SEP attitude if you're ready. Time.
 YANKEE CLIPPER Okay, we're ready to copy.
 CAPCOM Roger. Undock time 107:54:00. Your attitude is roll 180 pitch 288 yaw 0. Separation 108:24:42. Over.
 YANKEE CLIPPER Clipper copies.
 INTREPID Intrepid copied 107:54:00, 108:24:42 and the attitudes were 180, 288, and 0.
 CAPCOM Affirmed.

INTREPID And there is NOUN 48 and it reads plus
000504 plus 00576. Going to VERB 34 inner.
CAPCOM Roger, Pete.
CAPCOM Clipper, Houston. I have a rev 13 map
update, if you're ready.
YANKEE CLIPPER Okay, Houston. Go.
CAPCOM Roger. LOS 106:58:33, 107:23:17, 107:44:39.
YANKEE CLIPPER Clipper copied.
CAPCOM Clipper, Houston. We're through with your
computer. Intrepid, if you've got P00 and data, we're ready
to roll.
INTREPID Okay, and how does the GDA position look?
CAPCOM GDA is go. We're ready for throttle.
INTREPID Commander's soft stop.
CAPCOM Roger. Confirmed.
INTREPID And that's commander's full throttle.
CAPCOM Roger. Confirming. Intrepid, Houston.
Do you have P00 and data?
INTREPID LMP's soft stop. That's affirmative.
CAPCOM Uplink is on the way.
INTREPID Roger. That's the soft stop on the LMP.
CAPCOM Roger, Al. Looks good.
INTREPID Here comes MAX. Okay going back to MIN.
CAPCOM Intrepid, Houston. We missed MAX. I think
we got mixed up in the time delay.
INTREPID Okay. I have MAX now.
CAPCOM Okay. We copied MAX now.
INTREPID Houston. I went through all the AGS memory.
That you gave us last night on the update and they all checked
out on the update.
CAPCOM Roger.
CAPCOM Intrepid, Houston. Full throttle looks
good on the LMP side.
INTREPID Roger.
INTREPID Houston, I can step ahead here, and do RCS
checkout if you like right now.
CAPCOM Standby a minute, Pete.
INTREPID Say, again.
CAPCOM Standby a second, Pete. Intrepid, Houston.
We're ready for that RCS when we finish the uplink.
INTREPID Okay. Dick, how much time do you have for
the active maneuver?
YANKEE CLIPPER I should be at the attitude by 106:15
at the latest, Pete.
INTREPID Okay. I think I can do the whole hot-fire.
YANKEE CLIPPER Okay, by me. Let me know.

END OF TAPE

INTREPID When do you want to maneuver, Yankee
 Clipper. Tell me what type you have to maneuver.
 CAPCOM Intrepid, Houston. The computer is
 yours.
 INTREPID Okay. Coming at you with a PTCA
 cold fire.
 CAPCOM Roger.
 INTREPID Hey, Yankee Clipper, you read Intrepid?
 I'm going to be firing here in a minute.
 YANKEE CLIPPER Okay. I'll go to 3 when you want.
 INTREPID Okay.
 CAPCOM Intrepid, Houston. Your TPCA cold
 fire looked good.
 INTREPID Coming at you with a No. 3 step.
 CAPCOM Roger, Pete.
 INTREPID All those numbers are off by 1,
 Houston, is that all right?
 CAPCOM Intrepid, Houston. You're GO.
 INTREPID Okay, going to Step 4. Okay, Yankee
 Clipper, CSFY deadband at hold verify CSC MODE 3,
 tunnel is vented to zero.
 YANKEE CLIPPER Okay. All those things are done.
 GO. Copy, Pete?
 INTREPID Roger. I copy.
 YANKEE CLIPPER I'm in 3.
 INTREPID Flight (garble).
 INTREPID Coming at you, Houston.
 CAPCOM Roger, Intrepid.
 INTREPID Okay, want a damp up, Yankee?
 YANKEE CLIPPER No. Let it roll. Are you all through?
 INTREPID No, I've got some more. Just minimum
 impulse though.
 YANKEE CLIPPER Okay, let it roll this way. That's
 the way I want it to go.
 INTREPID Coming at you with PGNCS minimum
 impulse, Houston.
 CAPCOM Roger, Intrepid.
 INTREPID How's that look, Houston?
 CAPCOM Intrepid, Houston, looks good, break,
 your AGS aboard constant, and the checklists are good.
 Over.
 INTREPID I understand, Houston.
 YANKEE CLIPPER Okay, Pete, I'm going to continue
 the maneuver. I've got it.
 INTREPID Okay, you've got it, Babe. We're
 finished.
 YANKEE CLIPPER Watch your antenna. I'm going to
 OMNI B.

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1055500, CST 2017 268/2

YANKEE CLIPPER	This is Clipper on OMNI B.
CAPCOM	Roger, Clipper.
YANKEE CLIPPER	Okay. I'm maneuvering to tracking
attitude so will be on OMNI for you.	
CAPCOM	Roger.
YANKEE CLIPPER	Pete, (garble) 620 here in this
attitude.	
INTREPID	The tracking attitude.
YANKEE CLIPPER	That right.
INTREPID	Yes, I know.

END OF TAPE

INTREPID Houston, Intrepid.
 CAPCOM Intrepid, Houston, go.
 INTREPID Things are looking good enough I
 expect to hear my NOUN 69 is zero.
 CAPCOM Roger, Pete, so do we. Do you want
 to go down the REV early.
 YANKEE CLIPPER Okay, Pete, standing by.
 INTREPID It's okay with me, Pal.
 YANKEE CLIPPER Houston, I have 0620.
 INTREPID On my mark, 4, 3, 2, 1, mark.
 YANKEE CLIPPER Roger, Houston, Clipper. R1 plus
 00046, R2 27021, R3 00008. Over.
 CAPCOM Roger, Clipper. Go ahead, Intrepid.
 INTREPID Roger. R1 29926, R2 09015, R3 35980.
 The time 106 07 19.
 CAPCOM Roger. At 106 07 19, Clipper plus
 00046 plus 27021, plus 00008. Intrepid plus 29926 09015
 plus 35980.
 INTREPID That's affirmative.
 INTREPID And Houston, we'll go to aft ant - or
 forward antenna now in anticipation of Dick's tracking exer-
 cise.
 CAPCOM Intrepid, Houston. We'd rather have
 you stay with the steerable as long as you can.
 INTREPID Okay, we'll stay with the steerable.
 CAPCOM It's just possible we won't lose you.
 INTREPID Okay. Crazy. If you see us getting
 close, give us a holler, we're going to get busy in here.
 CAPCOM Will do, Pete.
 INTREPID Hey, Pete, we're coming upon Theophilus
 Look out to your left.
 INTREPID Ooh, yeh, I can see it from here now.
 YANKEE CLIPPER There, hear jets firing, Pete?
 INTREPID No.
 YANKEE CLIPPER Must be mine hitting your foot pad, Dick.
 INTREPID Yes, I'm in AGS hold.
 YANKEE CLIPPER Okay. Make sure.
 CAPCOM Intrepid, Houston with a K factor
 update when you're to copy.
 INTREPID Go ahead, Houston, ready now.
 CAPCOM Roger. R1 00100, R2 all zips, R3
 00073. Over.
 INTREPID Roger. 0001000, all zeros, 00073.
 CAPCOM Affirmative.
 INTREPID You were fast on that one, Houston.
 CAPCOM A-firm.
 CAPCOM Intrepid, Houston.
 INTREPID Go, Houston.
 CAPCOM Roger. If you've got time, Pete, can
 APOLLO 12 MISSION COMMENTARY 11/18/69 CST 20:27 GET 106:05 269/2

CAPCOM you give us another VERB 06 NOUN 20 at
 this attitude?
 INTREPID Yes, we got time, Dick?
 YANKEE CLIPPER Standby. I'm loading PD9 right now,
 again.
 INTREPID Okay, I'll standby.

APOLLO 12 MISSION COMMENTARY 11/18/69, CST 2037, GET 106:15 270/1

YANKEE CLIPPER Okay. Anytime Pete.
INTREPID Okay. On my MARK 4321 MARK.
YANKEE CLIPPER Houston, R1 reads plus 3 balls 44
R2 plus 269 56 53 plus 00054. Over.
CAPCOM Roger, Clipper. Go ahead Intrepid.
INTREPID Okay, Houston. Plus 299 28 plus 08952
plus 39534. The time 106 15 55.
CAPCOM Roger. At 106 355, Clipper plus
3044 plus 26956 plus 3054; Intrepid plus 299 28 plus 08952
plus 39534.
INTREPID That's a Charlie.
CAPCOM Roger. That GET was 106 1555.
Affirmative?
INTREPID That's affirmed.
INTREPID Okay Houston. You can keep the tabs
running and make sure I got this right. It seems to me
we're complete through 107 hours. All our AGS 46 we're
standing by to pick up with rendezvous radar self test and
AGS CAL. You see anything before that we haven't done?
CAPCOM Give us a second to review, Pete.
We think you're okay.
INTREPID Okay. Smoke her over, I don't want
to leave anything out.
CAPCOM Intrepid, Houston.
INTREPID Go, Houston.
CAPCOM Okay. We're up with you, Pete. Your
at 107.
INTREPID Okay. I think that's going to work
real good then, cause while Dick's not firing any thrusters
MAGS CAL gets rendezvous radar self test out of the way.
CAPCOM Roger.
INTREPID Let me know when you're going to start
tracking, Yankee.
YANKEE CLIPPER Okay, Pete. I've got 66 degrees
tracking in if you want to REV along with it and it's got
to come down to 22 before I'll pitch over it.
INTREPID Okay. You know where you are?
YANKEE CLIPPER Sure, I see all the scenery out in
front of me.
INTREPID That's good. Okay. Let me know if
you see a snowman when you go by.
YANKEE CLIPPER Okay.
INTREPID Houston, Intrepid. We forgot to
give you our RCS helium pressure. It's about 29 feet.
CAPCOM Roger, Al. Thanks.
INTREPID It's okay. The imp was outside
when I gave it to you.

INTREPID (Garble) over here to see what he's forgotten.
YANKEE CLIPPER Houston, Clipper.
CAPCOM Clipper, Houston. Go.
YANKEE CLIPPER I'm just looking over the electrical system. Do we have a battery A charge scheduled for this afternoon?
CAPCOM Standby, Dick, we'll check it out.
CAPCOM That's a negative, Dick. Next charge is 13130.
YANKEE CLIPPER You're going to make that SBS burn and that battery A is down quite a bit.
CAPCOM Roger, Dick and we copy and we will reevaluate it.
YANKEE CLIPPER Yeah. It's this one along the way up, I'm sure.
YANKEE CLIPPER Hey, Pete, we're getting close.
INTREPID Okay, Dick. Do your usual good job.
YANKEE CLIPPER My best.
INTREPID I know that.

END OF TAPE

INTREPID How are you doing, Clip?
YANKEE CLIPPER Okay, Bean. It's 10630. I'll be
starting the PITCH over so hang on.
INTREPID Okay, we'll be watching our antenna.
We are still on high gain.
YANKEE CLIPPER Okay, it's coming down into (garble)
INTREPID Have at her.
YANKEE CLIPPER Okay, Pete. I've got the target.
INTREPID Good show.
YANKEE CLIPPER What you got down there?
INTREPID What do we do with it? Which way are
we pitching?
INTREPID Boy of boy, Houston. Do we have a
fantastic view of Copernicus.
CAPCOM Roger, Pete.
YANKEE CLIPPER Hey, Pete, my boy, I gave you five of
my best ones.
INTREPID Good show, Richard.
CAPCOM How does the snowman look, Dick?
YANKEE CLIPPER Okay. We owe Houston -
INTREPID I really didn't have a good chance to
look at it there, Jer.
INTREPID Hey, Dick. I don't know if you can see
it but if you can you ought to take a look at Copernicus there.
That is really something else. And we owe him an 0620.
whenever he gets data.
YANKEE CLIPPER I am just looking at Copernicus. Houston
let me know when you have got the data.
INTREPID Isn't that something?
CAPCOM Roger, Clipper.
INTREPID Where are you going, Dick?
YANKEE CLIPPER I fixed a 158.
CAPCOM Clipper, Houston. We have your data.
YANKEE CLIPPER Okay. Head for what?
INTREPID For an 0620, then OFF BLOCK for
the AGS count.
YANKEE CLIPPER Okay, very good.
INTREPID It is pretty nice down here, Pete.
INTREPID I hope so.
INTREPID I tell you. I can't get over Copernicus,
Houston, that - there's nothing on any other part of the moon
that we have seen since we have been here that even looks
like that.
CAPCOM Roger, Pete. Hey, Clipper, we got
your P22 data.
INTREPID Did you get that, Clipper?

INTREPID He got your P22 data.
INTREPID Okay, Dick. Let me know when you are
steadied up.
YANKEE CLIPPER Okay, on my mark. 4, 3, 2, 1. MARK.
INTREPID Did you copy that, Houston?
CAPCOM Negative, Intrepid. You are going to
have to relay it.
INTREPID Okay. You can give me the angles if you
want, Dick, and I will relay them. I didn't copy them. Give
them again.
YANKEE CLIPPER Hello, Houston. Clipper on the high
gain.
CAPCOM Roger, Clipper. Loud and clear.
YANKEE CLIPPER Okay. Had to get you back before I
could give them to you. My 1 reads plus 00270, my 2 reads
plus 15866, my 3 read plus 00408.
CAPCOM Roger, Clipper. Go ahead Intrepid.
INTREPID Roger. 296853386235578. The time 1063640.
CAPCOM Roger. At 1063640 Clipper was plus
00270 plus 15866 plus 00408. Intrepid plus 29685 plus 33862
plus 35578.
INTREPID That's affirmative, Dick, you are clear
to go the AGS CAL attitude and we are standing by.
YANKEE CLIPPER Stay around and wait.
INTREPID Good show.
YANKEE CLIPPER If they (garble) overshooting (garble).
Did you know that?
INTREPID Yeah. Boy you sure throw the gunk
by in front of this spacecraft when you fire those forward
firing thrusters.
YANKEE CLIPPER Hey, Pete. We are ready to settle down.
Do you want to give them some more?
Intrepid Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1064000, CST 2102 272/1

YANKEE CLIPPER Hey, Pete, we're there and settled down.
Want to give them some more?
INTRIPID Okay, if you're all settled down. On
my MARK 4, 3, 2, 1 MARK.
YANKEE CLIPPER Houston, Clipper.
CAPCOM Go ahead, Clipper.
YANKEE CLIPPER Roger. Yankee Clipper with three more
gimbal angles. Plus 00779 plus 15745 plus 02348. Over.
CAPCOM Roger, Clipper. Go ahead, Intrepid.
INTREPID Roger. 29175, 33737, 33638, the time
1064030.
CAPCOM Roger. 1064030, Clipper plus 00779
plus 15745 plus 02348. Intrepid plus 29175 plus 33737 plus
33638.
INTREPID That's affirmative.
CAPCOM Roger.
INTREPID Okay, Clipper, would you disable
thruster B3, please sir? Or are you in FREE.
YANKEE CLIPPER How about if I go FREE and get the whole
works done?
INTREPID FREE is even better and make sure your
radar transponder is OFF.
YANKEE CLIPPER It is OFF, and I'm in FREE right now.
INTREPID Okay.
CAPCOM Intrepid, Houston. When you get a
chance POO and DATA. We have a PIPA bias update for you.
INTREPID What did you just do, Clipper?
YANKEE CLIPPER Nothing. I didn't do anything.
INTREPID I heard a big clunk somewhere.
YANKEE CLIPPER I've been accused of a lot of things,
but that's the worst. In here my mouth isn't, Pete.
CAPCOM Intrepid, Houston. Over.
intrepid Go ahead, Houston, Intrepid.
CAPCOM Roger. If you'll give us POO and
DATA, we have a PIPA bias update for you.
INTREPID You got it.
CAPCOM Roger. It's on the way.
CAPCOM Intrepid, Houston, computer is yours.
INTREPID Thank you.
CAPCOM Clipper, Houston.
YANKEE CLIPPER Go ahead.
CAPCOM Roger, Dick. The battery ALPHA is
real good shape. It's only got 7 and one-half hours missing.
YANKEE CLIPPER Okay. I'm happy if you're happy,
CAPCOM Roger.
INTREPID Houston, we got a program alarm,
1106, uplink too fast.
CAPCOM Roger, Pete.

CAPCOM Intrepid, Houston. We're checking to that alarm. There was no uplink coming at the time.

INTREPID Okay. I'd just thought I'd activate the rendezvous radar. I don't know if that had anything to do with it.

INTREPID Houston, why don't you send that uplink again. We might have had that program alarm and not noticed it.

CAPCOM Intrepid, Houston. We didn't see the alarm when we were uplinking. We think the uplink was clean.

INTREPID Okay, what do you think? Just a spurious alarm?

CAPCOM No, no, Pete. We'll look at it a little deeper and come back at you shortly.

INTREPID Okay.

YANKEE CLIPPER Hey, Jer, needless to say, I'm anxious to find out how those marks look to the people on the ground.

CAPCOM Dick, they look real fine.

YANKEE CLIPPER Thank you, I'm glad to hear that.

INTREPID Okay, Houston. Running a rendezvous radar self-test and my xmitter power is low according to my book. I've got 2.65. Let me give you all the numbers. AGC with 1.65, xmitter with 2.65, shaft air with 22 to 26, trunion air with 22 to 26. Also my tape reads 493 and one-half feet per second by 500 and the tape meter reads 195.2 miles, vice 194. How's that grab you?

CAPCOM Intrepid, Houston. Stand by.

END OF TAPE

INTREPID How's that grab you?
CAPCOM Intrepid; Houston. Roger. Standby. We'll look at it for a second. Intrepid, Houston, if you want to read off this gimbal bias we sent you to check it out, go VERB 01 NOUN 01 and check out address 1452 and 1456. Over.
INTREPID Understand.
INTREPID Roger. What should they read?
CAPCOM Roger. 1452 should read 77116 and 1456 should read 01573.
INTREPID 1452, 77116 and 1456 should read 01573.
CAPCOM That is affirmative, Pete.
YANKEE CLIPPER Pete, let me know when you're through with your rendezvous radar and get my transponder in the act.
INTREPID Okay.
INTREPID Houston, Intrepid.
CAPCOM Intrepid, Houston. Go.
INTREPID Just completed the AGS CAL. Looks like the AGS passed with flying colors. 540 with minus 00013. 541 was minus 00003. 542 was plus 00004. 544 was plus 00004. 545 was plus 00019. 546 was all zeroes.
CAPCOM Roger. Copy. 540 minus 00013 minus 00003, plus 00004 plus all zeroes 4 plus 00019 and plus all zeroes.
INTREPID That's affirmative. The only one that I thought that changed significantly was 544 which changed from a minus 6 to a plus 4.
CAPCOM Roger, Al.
YANKEE CLIPPER Al, are you through with the AGS cal and everything?
INTREPID That's affirmative.
YANKEE CLIPPER If you are, I'm going to go ahead and maneuver to the undocking attitude, okay?
INTREPID Good idea.
INTREPID Okay, Houston. I just checked the gimbal bias and those registers are loaded correctly. The radar test - all that checks correctly except the one number I gave you. Everything else worked fine.
CAPCOM Roger, Pete. Your rendezvous radar looks like it's pretty good. The transmitter power is a bit low, but it's go.
INTREPID Okay.
CAPCOM Intrepid, Houston.
INTREPID Go ahead, Houston.
CAPCOM Roger. We're about a minute from LOS, everything is looking real good. Your computer and everything is fine. The lowest possible idea that we can think for your 1106 alarm was, if you turned your DUA OFF when your computer was running it, that might have possibly caused it.
INTREPID What's a DUA?
CAPCOM Roger. That's your digital uplink assembly.

INTREPID

Oh. Okay.

PAO

This is Apollo Control. We've had loss of signal with Intrepid and Yankee Clipper. As the two spacecrafts, still docked, went around the corner of the visible face of the Moon - visible to the naked eye and to the antenna at the tracking station. To review briefly again some of the upcoming events leading to a second manned lunar landing. The soft undocking is scheduled to take place shortly after acquisition of signal during the 13th revolution. This will be at a ground elapsed time of 107:54 as per the flight plan. This soft undocking will be done in a radial direction. That is, the two spacecraft will be aligned toward the lunar surface so that the motion is radial as opposed to posigrade or retrograde when the undocking occurs. To accomplish this soft undocking, the probe is extended until the capture latches at the end of the probe are the only items still connecting the spacecraft together. Then they're unlatched very gently and this imparts a minimum amount of energy into the two spacecraft motions so as not to perturb the orbit and cause any changes in the orbital measurements. Separation maneuver which is a command module RCS maneuver will take place at 108:24:42. Velocity, up 2.5 feet per second. This again is a radial maneuver which will produce a separation at the time of the descent orbit burn by the lunar module of about 2 1/2 or 3 nautical miles. The descent orbit initiated maneuver which will place Intrepid on the - sort of elliptical orbit with a paracynthion of 8.3 nautical miles apocynthion of 60.6 nautical miles, will take place at 109:23:38. This will be a burn with the descent propulsion system engine. Retrograde 73.1 feet per second. This descent orbit initiated burn will be exactly opposite the point of power descent initiation. That is, opposite that in it's 180 degrees away or prior to the DOI or PDI maneuver. The DOI as mentioned earlier will put the Intrepid at 8.3 nautical miles above the surface at the time of power descent initiation. This is some 260 nautical miles uprange of landing site 7. Power descent initiate, again a descent propulsion system maneuver, with a retrograde velocity total, all the way down to touchdown, of 6619 feet per second will take place at 110:20:35. Touchdown is estimated to take place at 110:31:58. Just prior to undocking the command module color television camera will be turned ON, and this will be a 40 minute television pass. During the period between soft undocking and the separation burn, Dick Gordon in the command module will inspect the lunar module to see that the landing gear is deployed properly, and that all looks shipshape for Intrepid to make the landing. We'll acquire Intrepid and Yankee Clipper again some 40 minutes and 40 seconds from now. At 107 hours 4 minutes ground elapse time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 107 hours 44 minutes ground elapsed time. Some 24 seconds away from acquisition of signal in this the thirteenth revolution around the Moon. Coming up in 9 minutes 34 seconds on the so called soft undocking, in which Intrepid and Yankee Clipper will separate. And remain separated until rendezvous. We went acquisition of signal on the lunar module. Standing by for communications to begin.

YANKEE CLIPPER Houston, Yankee Clipper here.
CAPCOM Yankee Clipper, Houston, loud and clear.

YANKEE CLIPPER Okay, if you'll kill my tape for me, I'll get the TV on.

CAPCOM Roger.

YANKEE CLIPPER Thank you.

INTREPID And Intrepid reading you loud and clear Houston, we're ready for undocking.

CAPCOM Roger, Intrepid and we read you the same.

PAO Here in Mission Control, the flight director Cliff Charlesworth is polling all the positions for a "go" for undocking.

INTREPID Roger, roger.

PAO Yankee Clipper and Intrepid have been given a "go" for undocking. This was drowned out by the commentators last comments.

CAPCOM Yankee Clipper, Houston copying TV.

YANKEE CLIPPER Okay, thank you.

INTREPID Do you see me waving at you, Jerry?

CAPCOM You better have Dick focus it.

INTREPID Okay.

YANKEE CLIPPER It's focused. It's just dark where he is.

PAO Television is now coming down from Yankee Clipper looking out the window at Intrepid. One of the quads of RCS thrusters visible in the upper right hand corner of the picture.

YANKEE CLIPPER Four minutes, Pete.

INTREPID Roger. Four minutes away and we're standing by. We're ready to go.

YANKEE CLIPPER Okay, don't forget to soft undock. You'll probably get a little jar out there at the end. Let it damp for a little bit.

INTREPID Okay, you just tell me when I'm free. I'm going along for the ride until then.

YANKEE CLIPPER Okay.

YANKEE CLIPPER Two minutes.

INTREPID Roger.

YANKEE CLIPPER I'm on VOX, Pete, so I can talk and

APOLLO 12 MISSION COMMENTARY 11/18/69 CST 22:06 GET 107:44 274/2

YANKEE CLIPPER not have to hit a switch.
INTREPID Okay, Dick, I'm with you.
INTREPID Then I'm going to P47 in 1 minute and
30 seconds.
YANKEE CLIPPER Okay. Mark her "go" 1 30.
INTREPID Okay, now I'm going to dial the VERB 77
and standby on the enters as you release me.
YANKEE CLIPPER One minute.
INTREPID Okay, Dick.
YANKEE CLIPPER Foot pads look pretty good. I see
you with your landing gear down for a change.
INTREPID Roger.
YANKEE CLIPPER Five seconds. Make that 15.
Now it's 5.

END OF TAPE

INTREPID Al, you've got 15?
INTREPID Not expired.
YANKEE CLIPPER Okay. Here you go again.
INTREPID Ready.
INTREPID Back off, Dick.
INTREPID There he goes.
YANKEE CLIPPER I just wanted to wait to let that
damp, Pete.
INTREPID Okay, I got minus - I got minus 1 and
nothing. So forget it.
CAPCOM Intrepid, Houston. Looks good.
YANKEE CLIPPER How's the turn, Jerry?
CAPCOM Real good, Dick. Real Good.
YANKEE CLIPPER Okay.
INTREPID Okay, Dick. YAW left 60.
YANKEE CLIPPER Hey Pete. You're cutting that out to
me.
INTREPID Roger. Go on VOX.
YANKEE CLIPPER Pete, give me a radio check?
INTREPID How do you read, Yankee Clipper?
INTREPID On the (garble) 345 54321. How's that?
INTREPID Pick up your yaw.
INTREPID How's that picture, Jerry?
CAPCOM INTREPID, Houston. The picture is
beautiful.
YANKEE CLIPPER Quite a sight, isn't it?
CAPCOM It sure is, Dick. We're copying
Pete's yaw maneuver now.
INTREPID Confirmed. Just about got it
completed.
INTREPID Okay Dick. How do you read me?
YANKEE CLIPPER Loud and clear now, Pete.
INTREPID All right. Pitching up 90.
CAPCOM Clipper, Houston. Your FM is breaking
up on occasions.
YANKEE CLIPPER What's breaking up?
CAPCOM Your FM is breaking up.
CAPCOM It's looking good now.
CAPCOM Intrepid, Houston. If you give us
POO and DATA we'll start your uplink.
INTREPID You've got it.
CAPCOM Roger. On the way Pete.
PAO Apparently some difficulty being
encountered in locking on with the steerable high gain
antenna on the Command Module. To get a good TV picture in

PAO and communications.
INTREPID Hey, you look pretty nice over there,
Yankee.
INTREPID Hey Dick, you read me?
CAPCOM Yankee Clipper, Houston. How do you
read?
YANKEE CLIPPER Houston, Clipper. Loud and clear.
CAPCOM Roger. Intrepid's on.
INTREPID Hey, Houston. Tell him to turn on VOX
because he's cutting out his own VHF.
YANKEE CLIPPER Intrepid, Yankee Clipper. Say again.
INTREPID Okay. You were cutting out your own
VHF being on VOX. Your camera was keying it.
YANKEE CLIPPER Okay. I'm on the VOX now and you're
cutting out on me now.
INTREPID Okay. How's that.
YANKEE CLIPPER Okay. That's better. Stay there.
INTREPID Okay. You've got it on me. I'm not
going to touch this thing again.
CAPCOM Yankee Clipper. I'll turn on the
tracking light for a minute, see if you see it.

CAPCOM Intrepid, Houston, with a DOI pad.
YANKEE CLIPPER I've got it now. I got your lights.
INTREPID Check Intrepid, Houston.
CAPCOM Okay. Standing by.
INTREPID Go Houston.
CAPCOM Yankee Clipper, Houston. Try Pitch
minus 78 yaw plus 225 on your high gain.
YANKEE CLIPPER Yeah, that's where its bad, Jerry.
CAPCOM Roger. You're breaking up pretty bad.
CAPCOM Intrepid, Houston. C30 LM maneuver
DOI pad. NOUN 33 109 23 3941 NOUN 81 minus 00708 all zeros
plus 00151 NOUN 42 00605 plus 00083 00724. Burn time 029000
297 AGS minus 00709 plus all zips plus 00144. The rest is
NA. Over.
INTREPID Roger. Copy 109233941 minus 00708
all zips plus 00151 00605 plus 00083 00724 029000 297 minus
00709 plus all zips plus 00144.
CAPCOM That's affirmative, Al. Break. The
computers yours.
INTREPID Houston - is? Okay. That's what
I wanted to know. Thank you.

APOLLO 12 MISSION COMMENTARY, 11/18/69, CST 22:16, GET 107:54 275/3

INTREPID Can't get any good pictures of you
today Dick. You're just - the Sun's not in the right place.

YANKEE CLIPPER Okay. We'll do it tomorrow.

CAPCOM Clipper, Houston.

YANKEE CLIPPER Go ahead, Houston.

CAPCOM Roger. Have you tried reacquisition
on high gain? And if you have why don't you try secondary
transponder. Intrepid, Houston with a no PDI plus 12 pad.

INTREPID Straight break this is Intrepid. If
it would be any help to you Yankee Clippers S-band antenna
is just wandering - it's just oscillating back and forth
in two directions like it can't hold VOX.

CAPCOM Roger, Pete. Thanks.

INTREPID It looks like it's in some sort of continual
search mode. Ready to copy the no PDI plus 12.

CAPCOM Roger, Al. NOUN 33 110 32 0470

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1080400, CST 2226 276/1

CAPCOM NOUN 33 110320470, NOUN 81 plus
01169, all zips, plus 01310, NOUN 42 01476 plus 00133,
01756, Burn time, 041000199, AGS plus 01148 all zips, plus
01328, NOUN 11 111 17 all zips, NOUN 37 11258 all zips.
over.

INTREPID Roger, Houston, copy. 110320470,
plus 01169, all zips, plus 01310, 01476 plus 00133 01756,
041000199, plus 01148, all zips plus 01328, 11117 all zips,
11258 all zips.

CAPCOM That's affirmative, Al. I've got your
PDI pad and your PDI is less than 10 and greater than 10

CAPCOM Roger, Al. PDI TIG 1110203758,
NOUN 61, 0942 minus 00049, FDAI 356110000, VETA 231 is plus
56960, PDI less than 10, NOUN 37, 11258 all zips, PDI greater
than 10, NOUN 37, 11457 all zips. Over.

INTREPID Roger, copy. 110203758 0942 minus
00049 356110000, plus 56960 11258 all zips, 11457 all zips.

CAPCOM That's affirmative, Al. I have T-2
for you, now.

INTREPID Roger, T-2 abort. TIG 110420200
NOUN 37 11656 all zips, T-2 at PDI plus 21 minutes, 25
seconds. Over.

INTREPID Roger. 220420200, 11656 all zips,
2125.

CAPCOM Roger. T-3, if you are ready.

INTREPID We are ready.

CAPCOM Roger. T-3 TIG 112274200, P-22
acquisition at 1122500 break Yankee Clipper, you are coming
on loud and clear on the TV now.

YANKEE CLIPPER Roger. I had to go to manual on my
high gain. It won't stay locked on.

INTREPID It's nice and steady over there,
now, Dick. I guess something went wrong with the auto
track.

YANKEE CLIPPER Yes. It's because I'm in manual that
it is staying in there now.

INTREPID Yes. It's pretty solid. It just
wobbles a little bit when you fire thruster. Readback,
Houston, is 112274200 1122500.

CAPCOM That's affirmative, Al.

CAPCOM Clipper, Houston, did you try the
secondary transponder before you went to manual?

YANKEE CLIPPER That's affirmative.

CAPCOM Roger.

CAPCOM Intrepid, Houston. I have your
gyro torquing.

APOLLO 12 MISSION COMMENTARY, 11/18/69, GET 1080400, CST 2226 276/2

YANKEE CLIPPER - the auto lock mechanism.
INTREPID Hold it just minute. We'll be right
with you.
CAPCOM Okay. Standing by.
INTREPID Go ahead, HOUSTON, ready to copy.
CAPCOM Roger. Your LM gyro torque angles,
X minus 00045 Y is minus 00035 Z is minus 00092. Over.
INTREPID Roger, copy. Minus 00045, minus 00035,
minus 00092.
CAPCOM Affirmative. Break. Clipper,
Houston, with a map update, Rev 14.
YANKEE CLIPPER Okay, GO and I copied all the other.
CAPCOM Roger, Dick. LOS 1085658109213810943
04. Over.
YANKEE CLIPPER Roger 1085658 plus 092138 with
094304.
CAPCOM Affirm.
YANKEE CLIPPER And I'm standing by for sep.
CAPCOM Roger, Dick.
INTREPID Say, Houston this sep went pretty smooth
today.
CAPCOM Affirmative, Pete.
INTREPID Looks like because of your tracking,
Dick, they raised their landing site altitude about 2400 feet.
END OF TAPE

INTREPID That's right. Because of your tracking, Dick, they raised the landing site altitude about 2400 feet.
YANKEE CLIPPER Isn't it hard to believe, Al. It looks like it was in a hole to me.

INTREPID And, Houston, I guess you saw the landing radar self test that came out 40.

CAPCOM Roger, Pete. We copy that.
CAPCOM Intrepid, Houston. We would like to get your value on transmitter power on that.

INTREPID Okay. Wait one. They were both 3.6.

CAPCOM Roger. Copy.
INTREPID Actually the velocity xmitter was 3.62 and the altitude xmitter was 3.60.

CAPCOM Roger.
YANKEE CLIPPER Houston, Yankee Clipper.

CAPCOM Go ahead, Clipper.
YANKEE CLIPPER I'll go back to primary transponder here as soon as we separate. This one hasn't helped it a bit. Looks like I have lost the auto track feature in the high gain.

CAPCOM Roger, Dick. We concur on that.
INTREPID Dick. You still in secondary servo there. You might go back to the primary ones.
CAPCOM All right Conrad. You are stealing our thunder now.

INTREPID Okay. Just trying to help out.
CAPCOM You keep your mark just ahead of me.
YANKEE CLIPPER If you both recall, that is how we left it in the first place.

INTREPID Yeah, but it wasn't breaking lock on you. Just getting intermittent signal strength.

YANKEE CLIPPER What's getting now?
INTREPID The only reason I am beating you, Jerry, is I'm 257,000 and some hundred miles closer to him than you are.

CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Roger, Pete. The way things are looking right now you are going to be starting PDI about 5 miles north of track and during the descent you are going to be steering south.

INTREPID Five miles north of track, Okay? As long as it knows it, it is okay with me.

CAPCOM Clipper, Houston. Are you going to try those primary servo electronics?

YANKEE CLIPPER It's been tried. How is it looking?

APOLLO 12 MISSION COMMENTARY, 11/18/69 2 :36 PM CST GET 108:14:00 277/2

CAPCOM Looking good and solid now.
INTREPID The antenna is not moving around at all.
It appears to be locked up tight.
CAPCOM Clipper, Houston. Are you in AUTO now?
YANKEE CLIPPER Negative.
Intrepid Forget it, Dick. Go back to MANUAL.
CAPCOM Roger. We copy your AUTO, Dick. You
are better off in MANUAL.
INTREPID Is it still in AUTO, Dick? It is just
locked up solid if it is.
YANKEE CLIPPER No, it's MANUAL.
INTREPID Okay. Sorry.
YANKEE CLIPPER I can move around in here pretty good
when I have all this room.
INTREPID This is one of the better visuals I have seen
Dick.
YANKEE CLIPPER Yeah, you are right. I have been taking stills
and I let it get out of view of the TV. I got to get you back.
INTREPID I have got 1 minute and 40 seconds.
MARK to sep.
CAPCOM Clipper, Houston. You are GO for SEP.
YANKEE CLIPPER Roger.
CAPCOM Intrepid, Houston. Give us MARK with
1 minute to go to SEP, will you?
INTREPID It is already 1 minute. I'll give you
one at 45 seconds.
INTREPID MARK. 45 seconds.
INTREPID Houston clear with that, Yankee Clipper?
YANKEE CLIPPER I don't have average G yet, Pete.
INTREPID Okay. I may have copied the time down
wrong.
YANKEE 10824 point -

END OF TAPE

INTREPID You concur with that Yankee Clipper?
YANKEE CLIPPER I don't have average g yet, Pete.
INTREPID Okay, I may have copied the time down
wrong or something.
YANKEE CLIPPER 108:24:42.
INTREPID Okay, 42. I got 22.
YANKEE CLIPPER Average time. Average g.
INTREPID Very good.
YANKEE CLIPPER I'll be watching you.
INTREPID Okay, we'll be looking for you, too. Okay,
there he goes. He burning.
CAPCOM Intrepid, Houston. You were off on that
figure by 20 seconds. CSM was right.
INTREPID Yes. I had the wrong time. He's burning
now and he looks good out there.
CAPCOM Roger.
YANKEE CLIPPER The burn is complete.
INTREPID Bye, bye.
YANKEE CLIPPER See you, troops.
CAPCOM Clipper, Houston. You can terminate average
g now.
YANKEE CLIPPER It's done. It's done.
INTREPID Okay, Houston. We're in up data link
for you anytime you want to send us the state vector.
CAPCOM We'll be ready in about 3 minutes, Pete.
INTREPID Okay. I'll see how long it will take to set
the computer, give me a holler when you're ready.
CAPCOM Roger.
INTREPID (garbled) We're taking them. We're taking
them.
INTREPID Dick, do you want to get your transponder on?
CAPCOM Clipper, Houston. Try OMNI BRAVO.
YANKEE CLIPPER 21 - They want OMNI BRAVO.
YANKEE CLIPPER Hello, Houston.
CAPCOM Clipper, Houston. Loud and clear.
YANKEE CLIPPER Still have the T.V. on the OMNI?
CAPCOM That's negative, Clipper.
YANKEE CLIPPER Okay, I'll secure it.
CAPCOM Clipper, Houston. Would you check your
DELTA V C.G. switch to CSM?
YANKEE CLIPPER CSM. Thank you.
YANKEE CLIPPER Intrepid, Clipper going to duplex B and
ranging.
INTREPID Okay. We're not ready for you yet, but go
ahead there and we'll come up in a minute. Okay, we're coming
up now.
YANKEE CLIPPER Okay.
YANKEE CLIPPER Okay, loud and clear, but let me get
locked on. Don't talk to me for a minute.

APOLLO 12 MISSION COMMENTARY,11/18/69,GET 108:24:00,CST 2246,278/2

INTREPID Are you ready with that up data link yet,
Houston?
CACCOM That's affirmative, Pete. Go POO and data.
INTREPID You got it. POO and data.
CAPCOM Roger. Intrepid, Houston. We've got another
delay. It'll be another minute before we can start it up.
INTREPID Okay.
CAPCOM Intrepid, Houston. It's on it's way.
CAPCOM Intrepid, Houston. Are you ready for your
data?
INTREPID Yes, go ahead.
CAPCOM Okay, it's on the way.
INTREPID Got you 2/10 of a mile.
YANKEE CLIPPER Pete, I show you locked on with the
radar.
INTREPID Okay. I got AUTO track.
INTREPID For some reason, we show a great deal out
of plane.
CAPCOM Intrepid, Houston. The computer is your's.
Break. Clipper, Houston. If you'll go POO and ACCEPT, we've
got your uplink.
INTREPID Okay it's all your's.
CAPCOM Roger, Clipper. It's on the way.
INTREPID Okay, I hold you at -

END OF TAPE

INTREPID Okay, I hold you at 1 point 3 - no
excuse me, Dick, I'm looking at the wrong register. You're
point 22 at about 3 feet per second.
YANKEE CLIPPER I've got you at point 2526 on the
VHF.
INTREPID The tape meter looks good?
INTREPID I also show you going a good ways
out of plane to me for some reason.
YANKEE CLIPPER I've got the same thing myself. I
don't understand it. You're coming back a little, though.
YANKEE CLIPPER How about some exterior lights for
me?
INTREPID Okay, coming on.
YANKEE CLIPPER Have my lights?
INTREPID Sure do.
YANKEE CLIPPER Okay, your tracking light's on.
CAPCOM Clipper, Houston. Computer's yours.
YANKEE CLIPPER Thank you.
YANKEE CLIPPER Pete, I've got you at 4.7 miles.
INTREPID Okay, I've secured mine, Dick.
YANKEE CLIPPER Okay.
INTREPID My Verb 83 shows you a 4.7 and 3 1/2
feet a second.
YANKEE CLIPPER Okay.
INTREPID Okay, Houston. I'm going to P40 for
you to look at it.
CAPCOM Roger, Pete. Stand by.
CAPCOM Intrepid, Houston. We're copying
your P40.
INTREPID Okay, can I go?
CAPCOM Roger. Go.
INTREPID Dick, I'm going to start my yaw
maneuver in a minute.
YANKEE CLIPPER Okay.
INTREPID Houston, Intrepid. How do you think
the AGS and PGNS compare?
CAPCOM Stand by one second.
CAPCOM Intrepid, Houston. You're PGNS and
AGS look real good.
INTREPID Thank you.
YANKEE CLIPPER Houston, Yankee Clipper.
CAPCOM Clipper, Houston. Go.
YANKEE CLIPPER Are you copying my gyro torquing
angles?
CAPCOM Clipper, Houston. We've got them now.

END OF TAPE

INTREPID What time is LOS?
CAPCOM Intrepid, Houston. LOS is coming up
in 4 minutes.
INTREPID Okay, we will try and have this
alignment finished for you, so you can look at it.
INTREPID There is a star angle difference
Houston, 4 balls 2 coming at you with the torquing angle.
Roger Pete.
INTREPID How's that grab you? You looking at
the DSKY?
CAPCOM Those are great, your go for DOI.
CAPCOM Intrepid, Houston. We are looking at
an AOS of 1094330.
CAPCOM And Clipper, Houston, we're looking
for you AOS at 10941.
CLIPPER Okay, I'll be there.
CAPCOM Intrepid, Yankee Clipper, your looking
good 1 minute LOS, we'll see you on the other side.
INTREPID Yes sir and after all that jazz about
the LPD old Al Debron is a half of a degree off of his YAW
and a half of a degree off of his pitch, which is in the
noise level and I can see it at the window, no screen.
CAPCOM Beautiful Pete, beautiful.
CAPCOM Intrepid, Houston. Is that in relation
to your new mark or the old one?
INTREPID No, that's right around the forty
mark and is up about 3 quarters of a degree to the
right and about a tenth of a degree down in pitch.
CAPCOM Roger.
CAPCOM So Long.

end of tape

PAO This is Apollo Control 109 hours, 41 minutes ground elapse time. One minute, 53 seconds to acquisition of signal as Intrepid and Yankee Clipper come around on the 14th lunar revolution. Some 39 minutes away from the power descent initiation. In the viewing room behind the Control Room here it's standing room only. Among the people in the viewing room are NASA Administrator, Dr. Thomas O. Paine and Mrs Paine, the nomonie for Deputy Administrator of NASA, George M. Low, Dr. George Mueller, Associate Administrator Office of Manned Space Flight, Associate NASA Admihednistrator Dr. Homer Newell, John Naugle, Associate Administrator Office of Space Science and Applications, Dr. Wernheder vonBraun, Director of Marshall Spaceflight Center, James C. Elms, Director of Electronic Research Center, Apollo 11 crewmen Neil Armstrong and Buzz Aldrin, Apollo 8 Commander Frank Borman, Dr. Stork Draper Director of Instrumentational Laboratory at Massachusetts's Institute of Technology and quite a few other people from industry and NASA. We've had Command Module AOS. Let's go live now and see how the burn went for descent orbit initiate.

CAPCOM Yankee Clipper, Houston. How do you read? Yankee Clipper, Houston. How do you read?

YANKEE CLIPPER Hello Houston, Clipper.

CAPCOM Roger, Clipper. Houston. Loud and clear.

YANKEE CLIPPER Roger. Good burn, good burn.

CAPCOM Roger.

CAPCOM Intrepid, Houston. How do you read?

INTREPID Hello Houston, Intrepid. Roger, we read you loud and clear and we just watched the first Earth ride. It was fantastic. Then we had a great DOI burn. The X residual was 0, Y was plus 2 tenths and Z was minus 6 tehths.

CAPCOM Roger, Pete. Copy your residuals. X, 0; Y plus 2 - .2; and Z minus .6.

INTREPID That's Charlie.

CAPCOM Intrepid, Houston. What were you AGS residuals. Over.

INTREPID Coming at you. One second. AGS residuals were plus 3 tenths plus 1 tenth and minus 6 tenths.

CAPCOM Roger, Al. Intrepid, Houston. We have your residuals now can you give us high bit rate?

INTREPID Roger. Going to high bit rate. And Houston whenever you're ready we're ready to give you P00 and data.

CAPCOM Roger, Intrepid. Intrepid, Houston. Would you put your biomed switch left?

INTREPID Okay. Go biomed left. How soon before you're going to send up the data, Houston?

CAPCOM How about 1 minute, Pete.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 0003, GET 109:41 281/2

INTREPID Okay, I'll hold then. We're standing
right by to do the mode 2 lock on radar so we're holding.

CAPCOM Okay. Yankee Clipper, Houston. I've
got a REV 15 map update for you.

YANKEE CLIPPER Roger, go ahead.

CAPCOM Roger. LOS 1105525 111 20 01 111 41 32,
over.

YANKEE CLIPPER Roger, copy.

PAO Coming up on 30 minutes to power
descent initiation. Mark 30 minutes.

CAPCOM Intrepid, Houston. Go P00 and data.
We're ready to go.

INTREPID We got it P00 and data for you, go
ahead.

CAPCOM Roger, it's on the way.

END OF TAPE

INTREPID You're about 30 degrees above our horizon now, Houston, and you're about a one third crescent moon and you really are beautiful - big blues and white.

CAPCOM Roger, Al. We put on our Sunday best for you.

INTREPID We're pretty well suited out up here ourselves. Boy, this thing sure flies nice.

INTREPID Hey, does it still look like we're 5 miles north?

CAPCOM Intrepid, Houston. Affirmative. You're still looking 5 north.

INTREPID Okay, what kind of an azimuth with respect to the sun will I have on that - that (garble) I'm not going to notice it.

CAPCOM Stand by, Pete. We're checking with the experts.

INTREPID Okay.

CAPCOM Intrepid, Houston. The computer's yours.

INTREPID Very good.

INTREPID Houston, Intrepid. When I went my updata link to void backup it made a whistle on our COMM, so I'm just going to leave it off.

CAPCOM Roger, Al.

CAPCOM Intrepid, Houston.

INTREPID Go.

CAPCOM Roger. Now that you got a new RLS we got a new address 231 for you.

INTREPID Go.

CAPCOM Okay. 231 is plus 56957.

INTREPID Plus 56957.

CAPCOM Roger.

INTREPID Coming at you with the radar, Dick.

YANKEE CLIPPER Okay.

CAPCOM Intrepid, Houston. That whistle you heard we think was because we were still commanding. They'd like to have you try it again.

INTREPID Just tried it and it looks good on the void backup bit.

CAPCOM Roger.

INTREPID Ascent BAT's coming on.

CAPCOM Roger, Intrepid.

INTREPID And we've got a mode 2 on.

INTREPID Houston, our first perilune altitude check used in the tapemeter shows that it's going to be about 57 500.

CAPCOM Roger, Al. Copy.

INTREPID Do you concur or not?

YANKEE CLIPPER Houston, Clipper.

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 00:13 GET 109:51 282/2

CAPCOM Stand by, Intrepid. We're checking.
Break. Clipper, go ahead.
YANKEE CLIPPER Roger, Jerry. Could you send me a good
LM state vector, please?
INTREPID Present check shows it to be 59 000 feet.
CAPCOM Roger, Al.
CAPCOM Clipper, Houston. We think it probably
won't do you much good to have it right now. It'd be better
later.
YANKEE CLIPPER Okay.
CAPCOM Intrepid, Houston. We're still looking
at a perilune of 50 000.
INTREPID Okay.
INTREPID Our third one shows it's going to be
64 000. It's just making kind of a sweep up. Might be this
tapemeter problem we saw on our self check.
CAPCOM Roger.

END OF TAPE

PAO Intrepid has gone into program 63,
 which is an automatic maneuver to the power descent initiate
 attitude, which is engine bell forward, face up.

INTREPID Okay, Houston. You're looking at
 P 63.

CAPCOM That's affirmative, Pete.
 INTREPID You got enough. I'll go back to P00.
 CAPCOM Stand by.
 CAPCOM Okay, Pete. Go to P00.
 INTREPID You're looking real good up here,
 Houston. How are you feeling down there?
 CAPCOM Intrepid, Houston. We're feeling
 great.
 CAPCOM Intrepid, Houston.
 INTREPID Go ahead.
 CAPCOM Roger, Pete. On this sun angle, or
 sun azimuth - as far as we can see there will be
 no noticeable difference, as far as your concerned. All you
 got to do is watch out and not fly through any clouds.
 INTREPID Okay. I'll stay away from the clouds
 and we're looking for the snow man.
 CAPCOM Roger.
 PAO The snow man, referred to by Pete
 Conrad aboard Intrepid is a shape of several craters,
 the belly button of which is where Surveyer 3 is located.
 It forms a rough outline of a snow man. An earlier cue
 during the descent after they have a visual acquisition of
 the landing site will be a crescent of craters ranging behind
 the landing site across the path of their flight.

INTREPID I sure hope you have lined up right
 Houston, because there sure is a big mountain right in front
 of us right now. I hope we go down in the middle. There
 one valley.
 CAPCOM Roger, Pete.
 INTREPID Hey, Houston. Where are we? Over
 Fra Mauro?
 CAPCOM Stand by, Pete. We're looking at
 lines, right now. We don't have our map up.
 INTREPID Okay.
 CAPCOM Intrepid, Houston. You probably just
 passed over Theophilus.
 INTREPID Okay.
 INTREPID Pretty darn rugged down there.
 CAPCOM Roger. Tell us when you want us to
 turn on the mirror.
 INTREPID You can turn the mirror on, give
 me the (garble) and we got the hook down.
 CAPCOM Roger.
 YANKEE CLIPPER (garble) 285. Clear deck.

END OF TAPE

PAO Reference to mares and hooks has to do with landing aboard carriers.

CLIPPER Interesting enough, Houston, at this attitude I still can see the lunar horizon. I have to really peer to find it but I can see it.

CAPCOM Roger, Pete.

CLIPPER And at 40 seconds we'll be going to P63.

CAPCOM Roger.

INTREPID Okay, Houston. There's 518 for you.

CAPCOM Roger, Intrepid. Looks good.

PAO Flight director, Cliff Charlesworth, is taking a final poll here for giving a go for PDI. Looks like its go all the way around.

PAO During the descent lunar module pilot, Alan Bean, will read out of the LM guidance computer such numbers as range to go to the landing site, horizontal velocity, and the angle at which commander Pete Conrad, should look to spot the landing site through the landing point designator etched on the left-hand window of the lunar module. During the final phase from 500 feet down, - -

CAPCOM Houston. No transient.

SC Roger.

PAO - - following low gate at 500 feet, Bean will add in the so called H-dot or verticle velocity rate of descent.

CAPCOM Intrepid, Houston. Go for PDI.

INTREPID Roger. Go for PDI.

INTREPID Hello, Houston. Hello, Yankee Clipper, Intrepid's up VOX.

CAPCOM Houston. Read you loud and clear.

INTREPID Copy loud and clear.

CLIPPER Thank you.

PAO Intrepid has gone to the VOX mode in the communications, that is, voice actuated circuit.

SC - - be one minute.

SC Mark one minute

SC (garbled) 30 feet.

CAPCOM Roger, Pete.

INTREPID Prepare descent in 35 seconds.

INTREPID I'd do it at 30, Al.

INTREPID Okay.

INTREPID (garbled) Average g descent engine - -

END OF TAPE

INTREPID Average G descent engine is on and the
 velocity light. Got it made. A pretty couple of lights there.
 CAPCOM Copy your altitude.
 INTREPID 10 9 8 we have burn 7 6 5 throw
 INREPID I have ignition.
 CAPCOM Better start.
 INTREPID 3 4 5, descent engines come in, over
 ride on.
 CAPCOM Throttle up to 26.
 INTREPID Yep.
 CAPCOM Copy - throttle up.
 INTREPID I can't hardly hear you for some reason.
 Okay, standing by for throttle up, Houston.
 CAPCOM Pete, it looks good.
 INTREPID Throttle up. It really feels good.
 CAPCOM Roger, Pete. Copy, throttle up.
 CAPCOM It sure is looking good Pete.
 INTREPID Alright
 CAPCOM Helium looks good regulators look good here.
 INTREPID Okay, standing by for 1 minute hack.
 CAPCOM Okay.
 INTREPID There's a little RCS activity, not too
 much. Arc 1 minute.
 INTREPID 5208 minus 2048 thousand. Really looks
 good.
 CAPCOM Intrepid, Houston. Now 69 plus 04200.
 Over.
 INTREPID Roger. Copy. Plus 04200.
 CAPCOM That's affirmative
 INTREPID 2169.
 CAPCOM Intrepid, Houston. Go for enter.
 INTREPID It's in babe.
 CAPCOM Intrepid, Houston. Looking good at
 2.
 INTREPID Okay, Roger. These lights are hanging in.
 INTREPID Looks good here.
 CAPCOM Roger. Midscent agrees with things
 in AG.
 INTREPID Very good. Very good.
 INTREPID Feels good to be standing up in a G
 field again.
 CAPCOM Roger.
 INTREPID Okay, 2 minutes and 30 seconds. 4276
 minus 53 and 44700, looks good. Poking right down there.
 INTREPID Look at that RCS.
 INTREPID Looks good Pete.
 INTREPID (garble)
 INTREPID They have been giving me EDBATS today/
 INTREPID Yea ED bat today.
 INTREPID There they go. 3 minutes at 24 feet

INTREPID per second fast, at 6 feet per second
low on H side and 100 feet low on altitude. Looking good.
CAPCOM Intrepid, Houston. Roger. Your looking
good at 3.
INTREPID Okay, Houston.
INTREPID I have an altitude light out and a
velocity light out.
CAPCOM Roger.
INTREPID I am showing minus 918 minus 1000.
Looks good, how does it look to you, Houston?
CAPCOM Roger, looks good, recommend you
incorporate it.
INTREPID No sooner said than done.
INTREPID Let me know when it converges, I'm
going back to my normal displays.
CAPCOM Okay, Pete.
CAPCOM Intrepid, Houston. Your going 4 and
go past 5.
INTREPID (garble)
CAPCOM Roger, copy ED BATS go.
INTREPID Roger, here it comes.
INTREPID Looking good. Looking good. Excellent.
Hold it right in there (garble) hangs right at 1100 ORIZ. Hold
it there.
INTREPID Okay, look over all of the gauges.
INTREPID Check out everything.
INTREPID RCS looks good electrks look good.
INTREPID Partial pressure c0 2 is it's usual
zero.
INTREPID Got a couple of good winners in these
2 spacecrafts.
INTREPID Okay, we are out of 35000.
CAPCOM Roger, Pete.
INTREPID Yea, I think I took a fair amount
of RCS firing, more than I think I should, but how is the
gimbal lock with you guys, Houston?
CAPCOM They are looking good Pete.
INTREPID Okay.
INTREPID There's a 5 minute hack Al.
INTREPID Okay.
INTREPID Boy it is really giving her heck on
the RCS, that must be the radar update.
INTREPID Better give the AGS an update, they
might need it.
INTREPID um huh
INTREPID 23 plus
INTREPID It really is banging it around, isn't
it?
CAPCOM Intrepid, Houston. Throttle down at
6 plus 22.

INTREPID We got her 6 plus 22.
 INTREPID We gave you a little AGS update.
 INTREPID (Garble)
 INTREPID According to this here computer, it's
 right on the money.
 INTREPID Better turn that sequence camber on
 in a moment.
 INTREPID Okay.
 INTREPID 6 plus 22 for throttle down, huh?
 INTREPID Yea
 INTREPID Okay.
 INTREPID Throttles down, I'm gonna put on the
 chamber. How's that stike you?
 INTREPID Great.
 CAPCOM Intrepid, Houston. Your looking good
 at 6.
 INTREPID Okay, standing by for throttle down.
 INTREPID (garble)
 INTREPID 23 let's give it another update.
 INTREPID Throttle down 6 plus 23
 CAPCOM Roger.
 INTREPID Where's zero. Where's the zero.
 INTREPID Give them another AGS update.
 INTREPID 9garble) Alright.
 INTREPID It's so early, I can just barely see
 the horizon, but baby is really giving it the cazoobe with the
 RCS, isn't it?
 INTREPID Sure is. Why don't I go ahead and
 put that camera on now?
 INTREPID Alright. Why don't you?
 INTREPID Got it.
 INTREPID Alrighty. 7 minutes (garble)
 CAPCOM Monitor D fuel 2
 INTREPID Looks good.
 INTREPID Descent fuel 2, it's there.
 INTREPID Okay Pete, 7 minutes
 INTREPID 1153 means your about 30 feet per
 second - wait a minute - let's go ahead and go for 730.
 INTREPID Okay, we're out of 19000 feet, I've
 got some kind of a horizon out there, I've got the craters
 too, but I don't know where I am.
 INTREPID 730
 INTREPID Let's smoke over the numbers at 730.
 INTREPID Okay, 730 153, not too bad. Minus 135
 descending a little faster then normal and we're a little
 bit low.
 INTREPID No luck.
 INTREPID 160 feet a second, huh?
 INTREPID 23, we will be in it in a minute.

INTREPID Number.
INTREPID Numbers ready.
CAPCOM Intrepid, Houston. Your looking good
at 8.
INTREPID That's at 12000 feet, according to our
tape meter, Houston.
CAPCOM Roger.
INTREPID Spring loaded to go grab that -
INTREPID Roger, your out at 10000 feet. Hook
up your lanyards.
INTREPID Okay.
INTREPID Standing by at 264.
INTREPID Okay.
INTREPID I'm trying to cheat and look out there, I
think I see my crater.
INTREPID Okay, baby.
INTREPID I'm not sure.
INTREPID Coming through 7.
INTREPID B 64 Pete.
INTREPID Digital 4. That's it, there's LPD.
CAPCOM Roger, Copy Pete. B 64.
INTREPID We're at 86000 update. Hey there it
is. There it is. Son of a gun, right down the middle of
the road.
INTREPID Outstanding 42 degrees, Pete.
INTREPID Hey, it started right for the center
of the crater. Look out there. I can't believe it, amazing,
fantastic, 42 degrees Babe. Just keep talking.
INTREPID 42 we are passing 3500. Coming down
at about 99 feet a second. Looking good. Got 15 per cent
fuel, I'll reset my watch.
CAPCOM Intrepid, Houston. Go for landing.
INTREPID I just want LPD to the right a little.
INTREPID Roger. Okay Roger, go. 40 degrees.
LPD Pete, 40 degrees.
INTREPID Fantastic, I can't believe it.
INTREPID Your at 2000 feet.
INTREPID How far.
INTREPID The boys on the ground do okay. 1800
feet up. 39 degrees. You got 94 seconds of LPD time left.
INTREPID Okay, I'll move forward a little bit.
INTREPID 38
INTREPID 38 degrees, 36 degrees, your 1200 feet,
Pete.
INTREPID 1000 feet, coming down at 30.
INTREPID Your looking good.
INTREPID Got 14 percent fuel. Looks good out
there babe, looks good.
INTREPID 32 degrees. 800 feet. 33 degrees.
Your at 680 feet 33 degress 600 feet antenna's okay.

INTREPID Okay.
 INTREPID 35 degrees. 530 feet, Pete. 530.
 471 all right 426.
 INTREPID I got it.
 INTREPID 400. Your at 366 Pete.
 INTREPID Right.
 INTREPID 366. Okay,
 INTREPID I got to get over 300 right.
 INTREPID Your at 330 feet coming down at 4.
 11 per cent.
 INTREPID Got loads of bas. 300 feet coming down
 at 5.
 INTREPID Oh look at that crater, right where
 it is suppose to be. Your beautiful.
 INTREPID 10 per cent.
 INTREPID 257 feet coming down at 5.
 INTREPID 240 coming down at 5. Hey you are
 really manuevering around.
 INTREPID Yea.
 INTREPID Come on down Pete.
 INTREPID Okay.
 INTREPID 10 per cent fuel.
 INTREPID 200 feet coming down at 3. You can
 come on down.
 INTREPID Okay.
 INTREPID 190 feet. Come on down. 180 feet 9
 per cent, your looking good. Gonna get some dust before
 long. 30 feet 124 feet, Pete. 120 feet coming down in
 6. Got 9 per cent, 8 per cent. Your looking okay. 96 feet
 coming down in 6. Slow down the descent rate. 80 feet coming
 down in 4. Your looking good. 70 feet, looking real good.
 63 feet 60 feet coming down in 3. 50 feet coming down,
 watch for the dust. About 46 low level. 42 feet. Coming
 down in 3. Coming down in 2, Okay. Start the clock. 42
 feet coming down in 2. 40 coming down in 2. Looking good,
 watch the dust. 31, 32 30 feet. Coming down in 2. Pete
 you got plenty of gas, plenty of gas, Babe. Stay in there
 CAPCOM 30 seconds.
 INTREPID 18 feet coming down in 2. He's got
 it made. Come on in there. 24 feet. Contact light.
 CAPCOM Roger. Copy contact.
 INTREPID Got probe.
 INTREPID Yes. Probe.
 INTREPID Okay, ignition on off. I cycled
 these valves, you got yours finished command overdue off?
 INTREPID Yep
 INTREPID Okey Dokey. I cycled the main shut
 off valve
 INTREPID Okay.
 INTREPID About to be closed.

INTREPID You get those RGS switches babe.
INTREPID The RGS are closed. Outstanding
man. After I'm on beautiful. Descent vent fire. Okay
I will smoke over the ascent. Al the ascent helium looks
okay.
INTREPID Okay descent red warning light, don't
worry about it.
INTREPID Ascent expendables looks good. So
do H2O.
INTREPID (garble)
INTREPID Okay, we are in hot shape, Houston.
We are in real good shape.
CAPCOM Roger, Pete.
INTREPID It can stop, you twist if -
INTREPID Up throw both control, both auto.
Both auto, twin engine command override off. Engine on off. I
got the 413 in cycle to parker valve.
INTREPID Okay.
INTREPID Thrust your iso valve to on. Main
shut off to on. Tubes vented. Master on on. Master on
we turned it off. Master on is off.
INTREPID Okay, Pete just watch the systems and
stand by.
INTREPID Okay.
INTREPID Man on man Houston. I'll tell you,
I think we 're in a place alot dustier then Neil's. Good
thing we had a stimulator, because that was an IFR
landing.
CAPCOM Roger, Pete.
INTREPID I am glad I was high Al, I (garble)
INTREPID I know it.
INTREPID Holy, Crane it is beautiful out here.
INTREPID It sure is, it's something else. We
flew by it -
YANKEE CLIPPER Hello Intrepid
YANKEE CLIPPER Hello Intrepid
INTREPID How are you?
YANKEE CLIPPER Intrepid congratulations from Yankee
Clipper.
INTREPID Thank you sir. We'll see you in 32 hours.
YANKEE CLIPPER Okay, have a ball.
INTREPID (garble) up in Houston you stayed to
B1
INTREPID I couldn't go (garble)
CAPCOM Okay (garble)
INTREPID Hit it.
INTREPID A 68. Recorder up. (garble)
INTREPID Hey we flew right by the crater Houston,
but this ground looks neat out here. We're not gonna have
any trouble going back there.

CAPCOM Roger.
INTREPID Okay. There's lunar light Houston.
got it.
CAPCOM Where did you put it down, Pete, over
on sight 4?
INTREPID I no sir about half way between sight
4 and sight 3. I flew by the right side of the crater and
then had to fly over to the left and land. We're in good
shape.
CAPCOM Roger.
INTREPID Reset your engine to stop, Pete.
INTREPID Okay.
INTREPID You guys did outstanding (garble)
I'll tell you that thing was right down the middle. Beautiful.
CAPCOM We're glad to hear that Pete.
CAPCOM Intrepid, Houston. We got you now 43.
INTREPID (garble) rides with the number one aviator.
INTREPID Okay.
INTREPID Roger.
INTREPID Throw going to B 12.
INTREPID Okay.
Intrepid 1 2 hit her.
INTREPID Give me the time for a B 12.
INTREPID Okay.

END OF TAPE

INTREPID - you enter. I need the times for
P12.
INTREPID Okay. .110, 42
INTREPID Wait a minute. Okay.
INTREPID 42 0200 200.
INTREPID Okay. (garbled) rest of it.
INTREPID Rest of it.
INTREPID Right there, right down your course.
INTREPID Right here.
INTREPID 5513.5 (garbled)
INTREPID Ner - I'll read it to you.
INTREPID All right, okay.
INTREPID 5513.5. Get it.
INTREPID Yep.
INTREPID And 19.5 plus 00195 and all zips (both
talking at once).
INTREPID Got it. That's it, 4 minutes, 35 seconds.
Anything else except the BETS, Pete?
INTREPID Houston, how do the AGS look?
CAPCOM Intrepid, Houston. PNGCS and AGS both
looking great.
INTREPID Okay. We're LM plus 1 in there.
INTREPID Dan, I can't wait to get outside. Look
at that.
INTREPID Garbled.
INTREPID 58158.
INTREPID Okay. VOX counting up.
INTREPID Okay. Loaded. Everything's ready to
go.
INTREPID Oh man, sit out so clear I couldn't
believe it.
INTREPID It's beautiful I tell you. I even took
a peek.
INTREPID It's a nice place to land.
INTREPID Boy it sure was driftty though.
INTREPID Yes sirre. It's loop wide but it was
just going too fast. Nice touchdown. It felt like just a
little bit on the back -
INTREPID It's a good thing we leveled off high -
INTREPID Yeah.
INTREPID And came down because I sure couldn't
see what was underneath us once I got into that duct. That
was a long way. That stuff was going to the right.
INTREPID Do you really. Just like you say. Look
at those boulders out there on your right, Pete. Gee they're
big. It's a pretty good place. Right over there.
INTREPID Yeah. Those rocks (garble) are we
on the Copernicus ray area?
INTREPID Is that right. Oh great.

INTREPID Dick.
 INTREPID I'm working it out.
 INTREPID Okay, Houston. We Go or stay.
 CAPCOM Intrepid, Houston. You're stan and if
 you'd like to recycle and try it again we'll talk to Simms.
 INTREPID Laughing. No. No.
 INTREPID We're just fine.
 INTREPID We're still mad at him for earlier in
 the week.
 CAPCOM Roger.
 INTREPID Okay. Let's get off VOX.
 INTREPID Okay. Going to POO, off VOX.
 INTREPID Hey Houston, are you watching our descent
 rates?
 CAPCOM Stand by, Pete. Intrepid, Houston.
 She's holding fine and the ventings going along well.
 INTREPID Okay. I'll tell you what. We're going
 to start hustling along here so I'd appreciate it if you
 give me a hollar when it gets down into the 2 to 8 range.
 CAPCOM Will do it, Pete. Yankee Clipper, Houston.
 Over.
 YANKEE CLIPPER Go ahead, Houston.
 CAPCOM Roger, Dick. Can you get the high
 gain pointed at us. We'd like to dump that tape recorder.
 YANKEE CLIPPER Okay, my pitch attitude is 81. Let
 me get some angles.
 CAPCOM Clipper, Houston. Did you copy that
 whole descent?
 YANKEE CLIPPER That's affirmative.
 CAPCOM Very good. Intrepid, Houston. You
 can close your AUX vent. Leave the fuel open for a little
 while.
 INTREPID Roger. Closing the AUX vent. It's
 closed.
 YANKEE CLIPPER Houston, do you have the high gain?
 CAPCOM Roger, Dick.
 PAO This is Apollo Control. The third and
 fourth humans to land on another planetary body, two rather
 exuberent humans, have completed lunar touchdown at site 7.
 Apparently rather close -
 CAPCOM Roger, we're looking.
 YANKEE CLIPPER And Gerry, did you get the torquing angles
 and the time?
 CAPCOM That's affirmative. We have them, Dick.
 INTREPID Okay, just looks like a good platform
 yet.
 INTREPID Here comes a nice cal at you Houston.
 CAPCOM Roger, Intrepid.
 INTREPID Okay, Houston. In copying the Noun 04
 and we'll go recycle. That's plus 00476.

CAPCOM Roger. Copy, Pete.
CAPCOM Intrepid, Houston. You can close your
fuel vent now. The she's holding.
INTREPID Roger. Fuel vent closed.
CAPCOM How do you read, over.
YANKEE CLIPPER Loud and clear, Ger.
CAPCOM Roger.
INTREPID Okay, Houston. Are you copying those
torquing angles?
CAPCOM Affirmative, Pete. We got them.
CAPCOM Ynakee Clipper, Houston. Over.
INTREPID Houston, did you copy the results of
the AGS pass?
YANKEE CLIPPER Houston, Yankee Clipper here.
CAPCOM Yankee Clipper, this is Houston. Would
you check your search tank switch and the ON detent. We're
seeing a little funny in it. Intrepid, Houston. Go.
YANKEE CLIPPER It's in the ON position.
INTREPID Did you copy the results of the AGS
cal down there?
CAPCOM That's affirmative, Al.
Roger, thank you Dick.
YANKEE CLIPPER It looks okay. It's falling up here,
Gerry.
CAPCOM Roger.
CAPCOM Ynakee Clipper, Houston. Over.
YANKEE CLIPPER Go ahead, Houston.
CAPCOM Roger, Clipper. We'd like to try some-
thing with your high gain antenna. Go to the wide beam width
in AUTO. Over.
YANKEE CLIPPER Have them in wide and AUTO.
CAPCOM Roger, Dick.
CAPCOM Yankee Clipper, Houston. It seems to
be holding. Now try medium beam width. Over.
YANKEE CLIPPER Okay, you got medium.
CAPCOM Roger, Dick.
YANKEE CLIPPER Okay.
CAPCOM Yankee Clipper, Houston.
YANKEE CLIPPER Go ahead.
CAPCOM Okay Dick. You're about a minute from
LOS. We're satisfied with your search tank pressures. You -
we'll take a little look in a little while at your S-band
next time you come around the horn. We'll be expecting
to see you at 111 40. Over.
YANKEE CLIPPER Roger. 111 40.
INTREPID Hey Houston, Intrepid.
CAPCOM Intrepid, Houston. Go.
INTREPID I think I did something I said I'd never
do. I believe I shut that beauty off in the air before touchdown.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 0058, GET 110:36 286/4

CAPCOM Shame on you.

INTREPID Well I was on the gages. That's the only way I could see where I was going I saw that blue contact light and I shut that baby down and we just hit from about 6 feet.

INTREPID Boy, you can sure see the stars out of this AOT. I'm in detent 1 right now looking at Sirius and I can see the whole constellation.

CAPCOM Roger. Break Pete. The Air Force guys say that's a typical Navy landing.

END OF TAPE

CAPCOM Roger. Break. Pete, the Air Force guys here say that's a typical navy landing.

INTREPID Okay. As long as the hook was down and we didn't bulb, I'm happy.

CAPCOM That's affirmative. You didn't get a bolter,

PAO A bolter is an aircraft landing on a carrier that misses the arresting wire and has to go around again. Unofficial touchdown time of Intrepid, 110 hours 32 minutes 29 seconds. This was the time the blue touchdown light - lunar contact light - in the LM cabin came on and from first indications, the landing point is about 350 meters due west of where Surveyor is located in the east wall of the crater. 350 meters computes out to about 1120 feet. We've had loss of signal with Yankee Clipper as it went behind the moon - around the corner. We'll continue to monitor air ground for further communications with Intrepid.

CAPCOM Intrepid, Houston.

INTREPID Go, Houston.

CAPCOM Roger. We'd like to check out a couple of AGS addresses when you get a chance. Would you read out address 233 and 464 for us, please?

INTREPID Okay, there's 233 - plus 00250. 464 is plus 00500.

CAPCOM Roger. Thank you, Al. Those addresses are okay.

INTREPID Okay.

INTREPID Hey, Houston, Intrepid.

CAPCOM Intrepid, Houston. Go.

INTREPID Okay. We were marking on (garbled) accent. We entered one wrong number and did a Verb 32. Is there any way to wipe out that set of marks now that we did the Verb 32?

CAPCOM Stand by, Pete. We'll confer with the experts there.

INTREPID Forget it, Houston. I can do the program over again.

CAPCOM Roger. They're asking for 30 more seconds.

INTREPID Okay, we'll wait. All we want to do is get outside, that's all.

CAPCOM Intrepid, Houston. The simplest thing to do is do the program over.

INTREPID We agree. Bye, bye.

CAPCOM Okay.

PAO This is Apollo Control. The crew of Intrepid are rather quiet at this time, doing some alinements of the Intrepid's inertial measuring unit, taking sitings on stars, other activities associated with powering down the LM, but we'll leave the circuit up in spite of the lack of

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 01:18 GET 110:56 287/2

PAO conversation to catch any discussions that take place between Intrepid and the ground. Some 29 minutes until Yankee Clipper comes over the hill again. This is Apollo Control standing by on live air-ground.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 01:33 GET 111:11 288/1

PAO This is Apollo Control. Lunar Module systems engineer reported to flight director, Cliff Charlesworth that at the time of touchdown, some 3.8 percent of descent propellants were still aboard at shutdown. Still standing by on air ground for resumption of communications between Intrepid and Mission Control. 22 minutes, 23 seconds until acquisition by Yankee Clipper.

INTREPID And there are your torquing angles.

CAPCOM Roger. They look great.

INTREPID And there's your Lat. Long and Altitude.

CAPCOM Roger. Let us look at that for a

second.

YANKEE CLIPPER Looks like Dick did some good tracking with an altitude like that.

CAPCOM Roger.

INTREPID Hey, Houston. It's even fun at one-sixth G inside of this spacecraft.

CAPCOM Don't break anything, Al.

INTREPID As soon as we landed we started handling the books like we do at the simulator at one G. We were throwing them off the table. Over near the circuit breakers and what have you.

CAPCOM Intrepid, Houston. Recommend you ACCEPT NOUN 89.

INTREPID Okay. That's done and we're going to POO. And if it's okay with you, we'll go ahead and do the second P 57 right now.

CAPCOM Roger, Intrepid. Go.

INTREPID Okay.

END OF TAPE

CAPCOM Intrepid, Houston. Would you read us out
AGS address 7 - 267?

INTREPID Coming at you. Plus 10240.

CAPCOM Roger. Thank you.

CAPCOM Intrepid, Houston. We're just chasing a
funny in the AGS and we're convinced its okay and we're
just trying to figure it all out.

INTREPID Okay. No sweat.

INTREPID Okay, Houston. There are the torquing
angle.

CAPCOM Roger, Pete. We copy.

INTREPID Want us to torque?

CAPCOM Roger. Go ahead.

INTREPID Okay.

INTREPID Okay. What do you want to do with that
one?

CAPCOM Let's look at it for just a minute, Pete.

INTREPID Okay.

END OF TAPE

CAPCOM Intrepid, Houston. Recommend you reject this NOUN 89. Your first one was a little better.
 INTREPID Okay. Reject it is.
 CAPCOM Intrepid, Houston. If you'll go through a data we're ready to fire you up some new vectors.
 INTREPID Roger. Just a second. 047 is plus 37433. And 053 is plus 05250.
 CAPCOM Roger. Stand by.
 We got them, Al.
 INTREPID Okay.
 CAPCOM Roger. Looks like you better tweak up your sterable a little bit. Looks like we're beginning to loose a little signal.
 INTREPID Okay. What do you recommend is the best possible angle?
 CAPCOM Stand by, Al. We'll get them.
 CAPCOM Intrepid, Houston. Try pitch plus 13, yaw minus 26.
 INTREPID The yaw will be good, but the pitch isn't even close. Must be some where around 110.
 CAPCOM Roger. It's pitch 113. Sorry. My fault.
 INTREPID That's where we are now, Houston.
 Houston.
 CAPCOM Roger.
 INTREPID Okay, Houston. You got through with data.
 CAPCOM Roger, Pete.
 CAPCOM Intrepid, Houston. I've got the Octal Data for your P 22 work around procedure.
 INTREPID Okay. We are ready to copy.
 CAPCOM Okay. Your first one is 04645 ENTER, and 35070 ENTER.
 INTREPID Okay. 04645 ENTER and 35070 ENTER.
 CAPCOM That's affirmative, Pete. And I've got a DAP load update for LM weight for you.
 INTREPID Okay.
 CAPCOM Roger. Your new LM weight is 10802.
 INTREPID 10802. Roger.
 INTREPID And Houston, are we stay yet?
 CAPCOM Affirmative. Stay for T3.
 INTREPID Okay. We'll go ahead on surface 9 and start our stay partial powerdown.
 CAPCOM Roger.
 INTREPID And do you have the P 22 act. time?
 CAPCOM Roger, Pete. It's on your lunar surface pad. Stand by. I'll read it out to you again.
 INTREPID Okay.
 CAPCOM We got it.
 CAPCOM Intrepid, Houston. We have an update on that P 22 act. time for you.
 INTREPID Go.

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 01:55 GET 111:31 290/2

CAPCOM Okay. Figure on 1122430.
INTREPID Roger. 1122430.
CAPCOM Affirmative.
CAPCOM Intrepid, Houston. The computer is
yours.
INTREPID Roger.
CAPCOM You have a new RLS and state
vector.
INTREPID Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, 02:03 CST, 111:41:00 GET 291/1

CAPCOM Yankee Clipper, Houston. How do you read?
CLIPPER Hello Houston. Yankee Clipper here.
CAPCOM Roger, Clipper. Reading you weak but
clear.
CAPCOM Clipper, if you'll give us P00 and ACCEPT
we'll start your update.
CAPCOM Yankee Clipper, Houston.
CAPCOM Yankee Clipper, Houston.
CLIPPER Hello, Houston. Yankee Clipper loud and
clear.
CAPCOM Roger, Dick. You in P00 and ACCEPT and
ready for an uplink?
CLIPPER That's affirmative.
CAPCOM Roger. Its on its way.
CAPCOM Clipper, Houston. I have REV 16 map-up-
date and a landmark tracking pad, if you're ready to copy.
CLIPPER Go ahead.
CAPCOM Roger. Map update REV 16, LOS is 112:53:48,
113:18:23, 113:39:28.
CLIPPER Roger, Jerry. Copy 112:53:48, 113:18:23,
113:39:28.
CAPCOM Roger, Dick. P22 landmark tracking pad
follows T1 is 112:20:00, T2 is 112:25:11, the landmark is
number 193 and its south 06. Over.
CLIPPER Roger. Landmark 193, T1 is 112:20:00,
T2 112:25:11 six miles south.
CAPCOM Affirmative.
CLIPPER Okay. I'll see if I can find it in the
same place we did last time.
CAPCOM Roger. You got something new to look
at down there too.
CLIPPER Let's save that for the next rev.
CAPCOM Yankee Clipper, Houston. The CMC's your's.
CLIPPER Roger, Jerry. Thank you. How are things
going on the surface?
CAPCOM They're doing great, Dick.
CLIPPER (garbled)
CAPCOM Clipper, Houston. Give us narrow beam
width.
CLIPPER Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 02:13 GET 111:51 292/1

CAPCOM Intrepid, Houston.

INTREPID Go ahead.

CAPCOM Well done, Intrepid. You got a bunch of happy geologists in the back room waiting to go. Say, we're standing by with a LM consumables update and also standing by for your description.

INTREPID Okay, we were just working on that and I'm very close to where I want to be but I'm trying to pin it down exactly.

CAPCOM Roger.

INTREPID I guess, Houston, for planning purposes we landed very close to the head of the snowman. I'm guessing exactly on the same line as selected site 3, but a little bit further left and let me give you some coordinates here. This is my first offhand cut at it.

END OF TAPE

INTREPID Say, Houston. Intrepid.
CAPCOM Intrepid, Houston. Go ahead.
INTREPID We're having a little trouble judging
distance. How long is my shadow?
CAPCOM Intrepid, your shadow length on a level
surface is 250 feet.
INTREPID You've got to be kidding me.
CAPCOM Intrepid, Houston. We could shorten that
a bit to 230. Which way do you think you are?
INTREPID Okay. Well, if my shadow's 230 feet long
we're really misjudging distances.
CAPCOM Roger, Pete. Are you short or long?
INTREPID Well, I'd say that my shadow is much
shorter than that.
CAPCOM Roger.
CLIPPER Houston, Yankee Clipper.
CAPCOM Clipper, Houston. Go ahead.
CLIPPER Is - is Intrepid going to a P22?
CAPCOM That's affirmative.
CAPCOM Intrepid, Houston.
INTREPID Go ahead.
CAPCOM A reminder. Prior to your P22 I'd like
you to execute VERB 41 NOUN 72.
INTREPID Okay. Going VERB 41, NOUN 72.
INTREPID At VERB 41, NOUN 72 did you want me to
do anyhow? I got it .27010.
CAPCOM Stand by, Pete.
CAPCOM Intrepid, Houston. The stuff you carried
out on surface 9 going to 270180 is good.
INTREPID Understand.
CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM We'll shorten that shadow length up for
you a bit. If we assume a 3-1/2 degree slope all the way
then you'll come up with a 150-foot shadow.
INTREPID Okay, then I'm judging about right. How
wide a diameter is the head of the snowman?
• CAPCOM Intrepid, Houston. Diameter of the head
crater from one inside rim to the other inside rim is around
400 to 500 feet.
INTREPID Okay. Right on the head of the snowman
to the left, let's use map 7-6 at coordinates M 5 and make
it 10.5. I think that's a very sharp, rocky rim crater.
Do you agree?
CAPCOM Copy. M 5, 10-5.
CAPCOM Intrepid, Houston. The coordinates which
you gave us, are those the coordinates of the crater or the

CAPCOM coordinates your present location? And also repeat your question relating to the blocking ground.

INTREPID What I want to know if that crater that I gave you, that's not where I am, I want - I have the crater I think I have that crater in sight. And its a very rocky rim crater and I want to know if the crater that I gave you the coordinates of is a very rocky rim crater. I think I'm sitting right next to the head of the snowman on the right-hand side at coordninance S - wait a minute - yea, S .8 and 13.3. I think that's where I landed.

CAPCOM Copy S8, 13.3. The coordinates you gave us of the crater are right next to bench crater. Do you confirm? Bench crater being at L5 rather than M5.

INTREPID I don't know. Yes. Wait a minute. I got to get on this P22. Hold the phone.

INTREPID Okay, Houston. We're standing by to track.

CAPCOM Roger, Intrepid.

INTREPID Yes, its bench crater. That's the one I'm referring to. And I think I landed at Ed crater almost just a little bit past one of the traverses that you got laid out there.

CAPCOM Roger, Intrepid. And we're trying to decide here whether your present position is really R2 rather than S8.

INTREPID Yes, you're right. R2. I'm sorry. I'm reading it backwards. R2.

CAPCOM Roger. Thank you, Pete.

INTREPID Houston, we're eating right now. We'll give a description here in another 15 minutes or so.

CAPCOM Roger, Intrepid. And we're standing by with a consumables update.

INTREPID I'm getting acquisition P22. Looks good.

CAPCOM Roger.

CLIPPER Houston, (garbled) locked on.

CAPCOM Roger, Clipper.

END OF TAPE

PAO This new estimate of LM location would
put it about 750 to 800 feet from the Surveyor.

INTREPID Hey, Houston. Intrepid has a visual
on Yankee Clipper.

INTREPID Hey, Houston. Relay to the Yankee
Clipper that I've got him visually.

CAPCOM Roger, Intrepid. Will do.

INTREPID Okay.

CAPCOM Clipper, Houston.

Clipper for your info. Intrepid has a visual on you.

INTREPID Thank you.

PAO This is Apollo Control at 112 hours,
30 minutes. The change of shift news conference is about
to begin at MSC News Center. We'll take this line down now,
so that we won't get behind on live air to ground following the
conference we'll turn any tapes over to the transcripti, during this
news conference. This is Mission Control, Houston.

END OF TAPE

YANKEE CLIPPER Hello, Houston. Yankee Clipper.
 CAPCOM Clipper. Houston. Go ahead.
 YANKEE CLIPPER Okay. Do you have all the data?
 CAPCOM Affirmative, Clipper.

We have it.
 YANKEE CLIPPER Okay. The next time, I want to see
 you put that distributor (garble)
 INTREPID Houston, Intrepid ready to copy the
 consumables update.
 CAPCOM Roger, Clipper.
 Intrepid, consumables update for GET 11 plus 50. RCS A
 80, B 75, 02 Descent, 87.6 and 97.4, H2O, 78.7, 99.2, Amp hours
 1243.3, 572.3.
 INTREPID Okay. Got it all, except the only
 thing that wasn't clear was the time.
 CAPCOM Roger. That was for 111 plus 50 plus
 a 00.
 INTREPID Okay. Got it. Thank you
 INTREPID Okay. Are you ready for VERB 74?
 CAPCOM Stand by on that, Pete. We'll be
 right back, with you.
 CAPCOM Okay, Intrepid, we're ready. VERB 74.
 INTREPID Okay, Houston. From your data where
 do you think we landed?
 CAPCOM Stand by on that, Pete. We have a
 good E MOD dump.
 INTREPID I think it's just a matter of UH.
 INTREPID Okay. I think it's just a matter of
 a few hundred feet one way or another. I flew right by the
 side of the crater and grounded to a halt and parked it, but
 that's about my best guess right now where we are.
 CAPCOM Roger, Pete. We'll be getting the
 message on the data and be getting back to you on that and
 the E mod looks - We have the data on the E mod.
 CAPCOM Intrepid, Houston. On your previous
 question on Ben's Crater, on our map here, we can't tell whether
 that is a blocking rim.
 INTREPID Okay. Well I - now you can make a
 subline for a reference to craters about 5 degrees off your left of
 the subline of my shadow is a very blocky rim, big blocks rising
 7-1/2 far away.
 CAPCOM Roger. Copy. You're looking at the
 crater which is 5 degrees south of the sun line.
 INTREPID Yes, 5 degrees left of
 the shadow.
 CAPCOM Roger.
 INTREPID Soon as we get done eating here, we'll
 get with it. We're pretty hungry.
 CAPCOM Roger, Intrepid. I - you deserve it.
 YANKEE CLIPPER This is Yankee Clipper. Tell them
 to get to work.
 CAPCOM Roger, Clipper

YANKEE CLIPPER They're down there having all the fun and you're doing all the work.

INTREPID They'll get with it soon, Clipper.

CAPCOM Intrepid, Houston.

INTREPID Go.

CAPCOM Help us get a better visual pin-down of where you are. Do you - are you able to locate a 50 foot block, approximately 100 foot, right in front of you?

They are 8 to 10 foot blocks about 50 foot in front of you, and that will be at R-pie 13.1.

INTREPID Well, I can't say that there is anything like that. There is one great big block that looks to me like it's 1500 or 2000 feet in front of us that meets that description. It's a really big fellow sitting out there.

CAPCOM Roger, Intrepid.

INTREPID However, what fools you, Houston, let me say this - let me say this, there's another light crater right smack in front of us, but it's now obvious to us. There is no shadow on it. That angle is so low that we're sitting here where we don't see any shadows and unless we look very carefully it's not obvious to us that there is a big crater out there. Now I sort of think - I kind of think that that may be the head of the snow man sitting out further - I'm not sure that I'm not sitting right on the other side of the Surveyor crater or just a little bit - I think really the best thing for us to do is to get out and look around. The sooner we do that the quicker we'll figure out where we are.

CAPCOM Roger, Intrepid. We concur with that and we're also standing by for your LM description. We have your lift off time for REV 16 to 19, when your ready to copy.

INTREPID Go ahead, Houston.

CAPCOM REV 16, P 4 is 1142606. REV 17, P 5 1162428. REV 18, P 6 1182246. REV 19, P 7 1202109.

INTREPID Roger. 1142606, 1162428, 1182246, 1202109.

CAPCOM Roger. Read that correct.

INTREPID Houston, Intrepid. AL's finishing up a raw (garble) and I'm just sitting here scanning with the binoculars, and this is the first thing I can give you according to the check list here. You already know that we flew right by the side of the snow man land rate (garble) just a little bit. And our yaw angle is 10 degrees and our general impression is - that we're in - country where I see most places have angular rocks. Very few rocks (garble) that are rounded. (garble) is angular. Now I'll let Al talk about the close up stuff.

CAPCOM Intrepid, Houston.

INTREPID Roger. Go.

CAPCOM Intrepid, we'd like to get to Yankee Clipper before LOS and we'll be right back with you.

INTREPID Okay.
 CAPCOM Yankee Clipper, Houston.
 CAPCOM Intrepid, Houston. Go ahead with your description of the horizon and we'll be breaking in to you as soon as we can get back with Yankee Clipper. We've lost COM temporarily.

INTREPID Okay. The rocks from this crater that I previously mentioned. When I look through the binoculars everything has a pure white (garble), big block bolders, but pure white. Now some of them are really big. When I say big, I'm talking (garble) 80, 20 feet up on the horizon. They have got to be 20 feet across.

CAPCOM Intrepid, Houston. You're COM is breaking up slightly.

INTREPID We were laughing about that ourselves.

INTREPID Okay. Houston. I'm back up in the air again. And just a general comment about all the rocks surrounding the torraine, at first glance out of the spacecraft I could distinguish absolutely no color difference in anything. In fact the only difference is looking (garble). I'm sure that some of these rocks have different colors and different textures, but from here in the spacecraft they don't appear that way. Looking at all the materials on the horizon and the blocks on the horizon, they all appear to be of the same material and they all appear to be pure white. Now we've got a pretty low sun angle and looking at them at low angle, so we have various other colors, but in these binoculars they look all white. They are all very blocky. They said the size goes all the way up to - I'm guessing - 20 feet. A couple of big ones on the horizon.

CAPCOM Roger. Intrepid.

CAPCOM Intrepid. Houston.

CAPCOM Intrepid. Houston.

CAPCOM Intrepid. Houston.

INTREPID Go ahead.

CAPCOM Intrepid. In order to pin down your location a little bit better. Would you try to give us the location with respect to the LM. That is distance and angle from your Z-axis of the large block, that you have on the horizon, and also the large craters, craters that are roughly 20 foot in diameter or larger. That is, slightly larger than the LM shadow width. Also, we want to press on here fairly quickly as we are getting a little bit behind our time line.

INTREPID That's what we think too. I'll tell you what we're going to do. I'll give you a description here and we're going to get ready and when we get out we'll take the TV and show you the craters and I think you'll have a pretty good handle on it. Generally right now, we're sitting on a - not a level surface and we don't see any particular IL's either. It's just sort of a like an undulating plane. You can see quite far in all directions. There doesn't seem

INTREPID to be any particularly high options such as mountains or high hills or anything like that, to interfere with the view. The only features that are objects besides this general rolling country that we're on is a rocky rim crater there (garble) visible almost in every direction. Some are quite close and some of them are far away. We got one of them for example at 12 o'clock to be the size of about 2000 or 3000 feet away, but if we didn't have these large boulders on it and had a pretty nice made rim maybe even up to 10 feet high range rim, we wouldn't be able to see it. I guess the diameter of that crater must be on the order of 6700 feet, that's at 12 o'clock. We've got a (garble) or a weather crater around it of every size of one just outside the window here at 2 o'clock at 15 feet that's about 6 feet in diameter and about 3 feet deep all the way up to - one that I see over at the 1 o'clock position it doesn't have a particularly raised rim, but it looks like it could have a diameter in the order of 400 feet, 500 feet. The - there are many rocks scattered around on the surface. Most of them are partially buried and as they are buried here you can see that there are little pellets of dirt that has build up around them almost all of them. And I can't tell of course whether if it's only from this direction or not, but all these rocks seem to have the same characteristics whether they are small or large. One interesting feature that is directly at 12 o'clock about 20 feet is a whole surface area that's a bit different from the rest in the fact that it's got sort of parallel lines or parallel (garble), about an 8th of an inch deep and running what would be north or south side and you can see it from about my 2 or 3 o'clock position all the way over to Pete's window. The left seems to (garble) some sort of boards that literally caused these traces to be made in the surface. I don't think it's our engines, because as I say they are perpendicular to the lines that our engines would have made. We'll be able to get a better look at that when we get out of course, and we'll also be able to use that close up stereo camera on it and just get some good pictures of it.

CAPCOM Roger. Intrepid.

INTREPID One - Pete also pointed out that there doesn't seem to be any possibility here of seeing anything like a contrast between different colored surfaces. There may be I can't notice the contrast of the different materials by looking at the texture, for example, that area that I described directly in front of the LM and those north, south lines on it. Other than that there is - it just looks like one uniform surface with many many craters in it. There is no immediately apparent white rim craters near us. Most of the ones that I can see out my window don't have a raised rim at all. They don't have any particular elongation. They seem to be, just from glancing at them about the same texture as the areas

INTREPID surrounding them. I think you're going to like this place, - Houston, because we can see in a not too far distance that pretty nice size rocks that are on the edge of the craters that we suspect could be deadrocks from below the regulars here. And well, I'd like to get outside and find how far we can move and how fast so that we know which ones of these we can visit. It looks there are going to be some good places out here to the West with the ALSEP. And I think in general that we're going to be able to gather in a lot of good information from where we are. This is a lot better surface I think than Pete or I could imagine before we got here. It looks like we going to be able to move around pretty well and it looks like there's going to be a lot of different types

END OF TAPE

INTREPID There's going to be some good places out here to the west with the ALSEP. And I think in general with this we're going to be able to gather a lot of good information from where we are. This is a lot better surface I think than Pete or I had imagined before we got here. It looks like we're going to be able to move around pretty well and it looks like there's going to be a lot of different types of samples lying about. So I think probably with that we'll go ahead and start rigging out.

CAPCOM Roger, Al. That was an excellent description. Before we hustle on here could you give us one quick answer. That is, the distance of the 400 foot quarter crater which you see at 1 o'clock.

INTREPID Roger. I'd say its about 500 feet, it runs from about my 12:30 to my 2 o'clock position. It looks - it doesn't look like it has any particular blocks on the rim. I'll - I think we'll be able to pinpoint ourselves pretty well when get out and look behind us a little. Maybe walk over to one of these craters.

INTREPID Also, Houston, I landed, not 20 feet, behind me - if I peer around the corner of the window here, I'm right on the edge of another great big crater. I just - it falls away at a - oh, I'm going to say 10 degrees slope at least, right behind us. We're right on the edge, we landed right past a fairly large crater. I'd say 300 to 400 feet in diameter. It was apparent to me to look four when I came into the landing but it sat down like two around the back. And I was going to like Pete close to my (garbled).

CAPCOM Roger, Intrepid. That will give us a lot to work with while you're in EVA prep. We're standing by.

INTREPID I'm sorry, Houston. Say again. We were talking.

CAPCOM Intrepid, that will give us a lot to work with while you're in you EVA prep. We're standing by for that now.

INTREPID Okay. I guess the next thing is I got to do PO6 and power down the IMU, if y'all concur.

CAPCOM Intrepid, go ahead. We're ready for the power down.

INTREPID Roger. Go ahead.

END OF TAPE

PAO This is Apollo Control at 113 hours 8 minutes
INTREPID - - the commander 11018, beyond 04019.
CAPCOM Roger, Intrepid.
PAO We're standing by live again.
PAO Both Pete Conrad and Al Bean have been giving descriptions of the - what they can see from the LM windows in an attempt to help the geologists locate them. They have the opinion that they'll be able to do a better job of locating where they are after they get out and are able to look around in all directions. Al Bean reported the LM was sitting on what appeared to be undulating plane rolling country as he said and no high objects, such as mountains or hills. They see a considerable number of blocky boulders. Al also mentioned the - directly ahead of them, seeing traces perpendicular to the LM, traces in shallow trenches, what he called traces in the surface. He thinks will be interesting to look at. They've pointed out there's no contrast in colors; everything appears to be pure white because of the sun angle. And Al Bean said "We think you're going to like this place". He says both he and Pete suspect there is lunar bedrock in the area. They suspect they can see some of the lunar bedrock. They also report they believe there are good places to put the experiment package, the ALSEP. And Pete Conrad reported that he believes they're sitting right on the edge of a rather large crater, approximately 300 feet in diameter, with about a 10 degree slope. (garbled) to stand by.

CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Say, Al. It sounds as though your cold has cleared up considerably. Have you - will you give us the - it sounds as though your stuffed head has cleared up considerably. Could you give us the last time at which you took the actafit?
INTREPID Roger. Took the actafit just before we put our helmets on prior to DOI. I don't recall exactly what that time was. And it started clearing up a long about PDI time and I think that being in this gravity field out here is helping it a bit. It allows it to drain. And today don't have a cold, it just seems to be a little bit stuffy.
CAPCOM Roger, Al. Thank you.
INTREPID Houston, what time is Dick going to go out and read the guage?
CAPCOM Stand by, Pete.
CAPCOM Intrepid, Houston. Your schedule for cabin depress about 1 hour from now. That's 114:20.
INTREPID Okay, Houston. I got you. 114:20. Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 3:40, GET 113:18 298/1

INTREPID Okay. Houston, I got your (garbled)
thank you.

PAO This is Apollo Control at 113 hours,
24 minutes. We're showing Intrepid's cabin pressure as
4.82 pounds per square inch and temperature inside the
cabin 63 degrees.

PAO This is Apollo Control. Based on the
verbal descriptions from Intrepids crew, geologists and the
mapping specialists continue to believe now that the LM is
on the northwest rim of the crater known as Head crater.
That's the crater just west of surveyors craters. Surveyor
crater forms the body of the snowman and this crater is the
head of the snowman. They believe the LM to be on the
northwest rim of the head crater.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 4:00, GET 113:38 299/1

CAPCOM Yankee Clipper, Houston.

YANKEE CLIPPER Hello Houston.

CAPCOM Clipper, we read you with a lot of
static in the background. We'll hold up until you lock on.

YANKEE CLIPPER Houston, Yankee Clipper.

CAPCOM Yankee Clipper, Houston. Go ahead.

YANKEE CLIPPER Roger. (Garbled.)

CAPCOM Clipper, if you'll give us P00 and
accept, we'll ship you up the more refined state vector.

YANKEE CLIPPER Okay Houston, it's all yours.

CAPCOM Roger.

YANKEE CLIPPER Stand by. I've got a (garbled).

CAPCOM Roger.

YANKEE CLIPPER Okay Houston, it's all yours.

CAPCOM Roger, Clipper.

YANKEE CLIPPER Okay.

PAO The crew of Intrepid is busy now with
preparations for the EVA. Plan to depressurize the cabin
at an elapse time of 114 hours, 20 minutes. It's now
113 hours, 45 minutes.

CAPCOM Yankee Clipper, Houston.

YANKEE CLIPPER Go ahead, Houston.

CAPCOM Clipper, we're having a slight delay
on getting that state vector up to you. We're having a
little PM problem. We have a P22 pass for you when you are
ready to copy.

YANKEE CLIPPER Ready to copy.

CAPCOM P22 P1 114 18 30 114 23 32 and cells
04. Update to the lat, long and attitude, disregard those
numbers in the Flight Plan. Lat minus 3.029. Longitude
over 2 minus 11.708. Altitude minus 1.13. And on your
map LAM 7. The coordinates are 13.4 K.9.

YANKEE CLIPPER Roger, Houston.

END OF TAPE

YANKEE CLIPPER Houston, (garble) 18 30. 24 114 2332.
24 1 minus 3 decimal zero plus 11 decimal 708 minus 1 decimal
13 (garble) 13 decimal 14 decimal 9.

CAPCOM Readback's correct, Dick. We have a
REV 17 map update for you also.

YANKEE CLIPPER Pass.

CAPCOM LOS 114:51:47 115:16:45 115:37:55.

YANKEE CLIPPER That's 114:51:47 115:16:45 115:37:55.

CAPCOM Readback correct, Dick.

CAPCOM Yankee Clipper, Houston. The computer's
yours.

YANKEE CLIPPER Thank you.

PAO This is Apollo Control at 113 hours
53 minutes. For the benefit of those persons in the news
center at MSC who are viewing the map on the television screen,
the LM location now has been moved up to the present best
estimate of the Intrepid's location and that is the northwest
rim of Head crater.

YANKEE CLIPPER Hey, Ed, how come you haven't been
giving me any TEI pads?

CAPCOM Clipper, stand by on that. I think
we'll work out the rendezvous solution first.

YANKEE CLIPPER Roger. Okay.

CAPCOM Say, Dick, when you're looking for
them in the sextant, if you look at the Head crater, we
suspect that they're on the north wind rim of Head crater.
That's the head of the snowman.

YANKEE CLIPPER Okay, I understand.

INTREPID Houston, Intrepid. In case you want
to know where we are, we'll be with you with the PLSS COMM
checks in just about 2-3 minutes.

CAPCOM Roger, Intrepid. Standing by.

PAO We're about 30 minutes behind the
timeline.

PAO This is Apollo Control, at 114 hours
7 minutes. Flight director Jerry Griffin expects -

INTREPID - put the modulator out there and
then coming up with COMM's and TV, closed, and we'll be
coming at you in a minute.

CAPCOM Roger, Intrepid. Standing by.

PAO Jerry Griffin expects that we may make
up some of this time that has been lost during some of the
communications checks and other checks. It's been - past
experience has been that those checks have not taken as long
as have been programmed. We essentially got 30 minutes behind
when the crew spent a little more time than scheduled in
describing the area in an attempt to locate the LM.

INTREPID Bog and crow 837 sensitivity. All
right, wait a minute. Wait a minute. VHFA - I know - VHFA

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 04:10 GET 113:48 300/2

INTREPID transmit. VHFB receive. Audio LMP.
S-band at TR. ICS to TR. Delay on. Both mark thrusters
next. VHFA transmit with B. VHFB receive. You ready for
the COMM. VHF voice ON. ON. OFF, OFF. I. Range off reset.
Delta A and B noise threshold plus 1 and 1/2.

INTREPID How you doing? Okay. Recorder on.
VHF antenna to EVA.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, 04:32 CST, 114:10:00 GET 301/1

INTREPID He ain't got the antenna at EVA. Uplink
twelvth and able, LMP connect the flip comm, PB audio.

INTREPID Here you go. Locked up.

INTREPID Okay. Flip mode LMP A. No non-vent flag
T press flag, and I hear you. Put those 2 guage 85 percent?
Give me a comm check.

CLIPPER Wait a minute.

INTREPID I hear you loud and clear.

CLIPPER Thank you.

INTREPID Okay. Known (garbled) vut the antenna does
not transmit garbles or loss of PM. Okay, I'm going to go
through my slip.

INTREPID Hold the cards for me?

CLIPPER (garbled)

PAO And telemetry data from the backpacks, the
portable life support systems looks good.

CLIPPER (garbled) Okay -

CLIPPER (garbled) All right.

END OF TAPE

YANKEE CLIPPER Intrepid
SC (garble)
YANKEE CLIPPER Just sighted Snowman. I believe I
have the Surveyor from the northwest side of the Surveyor crater.
CAPCOM Clipper, Houston. We copy that -
YANKEE CLIPPER (garble)
YANKEE CLIPPER It is just a shadow , it looks like
it is about a third of (garble) in distance apart.
CAPCOM Roger, Clipper. Copy you
YANKEE CLIPPER (garble) I have. I have Intrepid.
I have Intrepid.
CAPCOM Well done, Clipper. Copy 1 crater
diameter to the north. Is that affirm.
YANKEE CLIPPER He on the Surveyor crater is about
a fourth of a Surveyor crater in diameter to the
northwest.
CAPCOM Roger Clipper and well done.
YANKEE CLIPPER I'll tell you, he sure is laying
a careful shadow down there.
CAPCOM Roger.
YANKEE CLIPPER There's a fairly good size crater to
the north, slightly east of it. But Directly behind him he
is on the Surveyor crater.
CAPCOM Roger, Clipper.
YANKEE CLIPPER Now I am directly overhead. There is
a (garble) ray between the Surveyor crater and the ship.
CAPCOM Clipper, Houston, say again.
YANKEE CLIPPER The Intrepia is just on the left shoulder
of the snowman. He is looking at me. (garble) from the
Surveyor crater. I see the Surveyor. I see the Surveyor.
CAPCOM Roger Clipper. Good eyeball, well
done.
PAO Dick Gordon using the 28 power sextant
for the sightings.
YANKEE CLIPPER Hey, they look almost as good in these -
CAPCOM Roger Clipper.
YANKEE CLIPPER Let me know when you have your data.
YANKEE CLIPPER Houston. Clipper, do you have your
data?
CAPCOM Clipper, that's affirmative. We have
it.

END OF TAPE

YANKEE CLIPPER Garbled. And Houston, I'd like to do that again on the next pass so I (garbled) put the camera (garbled).

CAPCOM Roger, Clipper. That sounds good.

INTREPID Did you see her - did you. Say all of a sudden I get all kinds of calm. Did you hear me?

INTREPID Yeah.

CAPCOM Intrepid, we read you loud and clear.

INTREPID Garbled - all along. All along, Houston.

INTREPID Hello Houston, Intrepid. How do you read?

CAPCOM Intrepid, Houston. We read you loud and clear.

INTREPID Okay. Do you read Al?

CAPCOM Negative.

CAPCOM Al, we read you very weak in the background.

INTREPID Your radio.

CAPCOM Al, give us a short count.

INTREPID How do you read me now? Five - five four, three, two, one.

CAPCOM Al, we read you partially on the last part of that count with a loud hum in the background.

INTREPID How do you read now? I think -

CAPCOM Loud and clear, Al.

INTREPID Right.

INTREPID I accidentally missed you. Laughing. Let's go.

INTREPID You got to be kidding. Wait a minute, go back to Pete. Okay, we're going to complete the (garbled).

INTREPID Go to A.

INTREPID That's what it was, Pete.

INTREPID Yeah. Go to A.

INTREPID Loud and clear, babe.

INTREPID LM clear, go to B. Go to B, loud and clear.

INTREPID Okay. We'll take the radar, AR.

INTREPID How do you hear, Pete.

INTREPID Loud and clear.

INTREPID How do you hear, Houston?

CAPCOM Intrepid, we read you loud and clear and for your info, Clipper got a visual on you and also picked up surveyor.

INTREPID Hey, ask him where are we. Laughing.

INTREPID Houston, my 02 quantity is

INTREPID Mine's 90, Houston.

INTREPID 90 percent. Okay, feed me COMM -

CAPCOM Roger, 90 both.

INTREPID Okay. Did he tell you how far - did

INTREPID he have the LM and the surveyor -
 INTREPID Go ahead and (garbled) Pete.
 INTREPID ECS cabin repress CLOSED.
 INTREPID (garbled) search band SB OPEN.
 INTREPID ECS two fan one OPEN
 INTREPID OPEN two fan one on your side.
 INTREPID Okay, read me that.
 YANKEE CLIPPER Hello Houston, Yankee Clipper.
 INTREPID Communicator supporter full egress.
 CAPCOM Yankee Clipper, go ahead.
 INTREPID - return to egress. Cabin gas return
 egress. Two second relief AUTO, two tension relief AUTO.
 Verify ECS (Garbled) component lights come on.
 YANKEE CLIPPER Roger, Houston. (garbled) 97 13.6
 K.9.
 CAPCOM 13.6 and K.9, copy. Thank you Clipper.
 YANKEE CLIPPER That's challie.
 INTREPID The CAM converter full egress. We
 haven't yet turned egress relief AUTO.
 INTREPID I don't have an ECS light yet. There's
 nothing.
 INTREPID Well, that won't be - you know it
 runs down, takes a little while to go.
 INTREPID Oh, okay. Very good.
 INTREPID OPS connect, LMB first turn around,
 K lowely.
 INTREPID What do you want?
 INTREPID I thought you were going to undo it.
 INTREPID Oh, well, I can't from this side.
 INTREPID Okay. Stay still. Right there. Boy
 these PLSS's are nice in 1/6 G.
 INTREPID 1020, there's 5 more of that 020.
 Houston, Intrepid.
 CAPCOM Intrepid, Houston. Go ahead.
 INTREPID Roger. Did Yankee Clipper have us
 both in the sextant at the same time? Over.
 CAPCOM Roger, that's affirmative. He got
 you between Head crater and Surveyor crater slightly north.
 INTREPID That's it. That's where I figured we
 landed, okay. (garbled)
 INTREPID That's all I can do Pete. Put the
 hoses on.
 INTREPID Right (garbled).
 INTREPID Okay, let me put this down. That's
 funny. Oh, I didn't get something. You're going to have
 to turn around.
 INTREPID Okay.
 INTREPID Easy does it babes. Good shape. You
 got to be careful or I'll jump right through that cabin

INTREPID overhead everytime I want to say
something and a
INTREPID Okay.
INTREPID Got it. Just a second, I'll be right
with you. You could just carry this PLSS around for 29 hours.
It almost feels good. Laughing. Relatively speaking, it
feels great. Laughing. Okay, I got one more snap. Can
you bend over it? That's it. Easy.
INTREPID Okay. I got you. Oops. Laughing.
An O20 and a cable.
INTREPID Okay. Got to put this one on.
INTREPID You got it. You got that one?
Okay. Now turn, you got to stand, can you stand up straight?
INTREPID Yeah, but I can't turn any further. See
those - now wait a minute here.
INTREPID Okay, now you want this under this
one flap, don't you.
INTREPID Yep.
INTREPID Okay. Under the flap?
INTREPID Sanp, crackle, pop.
INTREPID There you go.
INTREPID Now, where are we?
INTREPID Back to the check list. Okay, let me
get your's now.
INTREPID Wait a minute.
INTREPID Now, let's get you off, okay. We'll
do this one first. Bags actuated RCU which you just snap
on, PS02 hose to side of PLSS which I did. Tune the isolation
valves to disconnect on the LMP. There you go.
INTREPID Okay. I connect that (garbled).
INTREPID I'll get them. Let me get them. They're
easier.
INTREPID Okay.
INTREPID Oh boy, look at the water.
INTREPID In the fruit loop.
INTREPID Where's all the water coming from?
INTREPID It comes right out of the inlet hose.
INTREPID It sure is. Okay. You want to connect
the oxygen.
INTREPID Just a second, I want to - I kind of
thought I was getting some water in my suit, it's just cold
air.
INTREPID Okay.
INTREPID It's connected and locked.
INTREPID Okay.
INTREPID What else have we got?
INTREPID Purge valves.
INTREPID Okay. One purge valve coming up.
INTREPID Wait a minute. It's a safety lock.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 4:49, GET 114:27 303/4

INTREPID Is is locked?
INTREPID Yes sir, it's locked.
INTREPID It's centered at top right, Okay.
INTREPID Okay, same thing. Lean over and let
me get your gear. Hang on I'm just going to squat down
like this and you can get all of it.
INTREPID Okay. That's a good way to do it.
INTREPID Then I'm going to fuel up on the
drinking water.
INTREPID Right.
INTREPID I've got the feeling we're going to
put an ALSEP package out.
INTREPID Okay. Stand up. There's not a lot of
room.
INTREPID Yep.
INTREPID Okay, here's one for over your head.
Here's one for under your arm.

END OF TAPE

INTREPID That's good
INTREPID Okay.
INTREPID Just a second.
INTREPID Okay, let me disconnect your - oops
that's better.
INTREPID And here comes your exhaust.
INTREPID 1033. Lot of water in those hoses.
INTREPID Hey, Houston you read Intrepid.
CAPCOM Intrepid, Roger. We copy your coming
on water in the hoses.
INTREPID Yea, it's just that the air seems to
be extremely cold coming in, at least the inlet hose
is quite cold. And the moisture is getting inside here. Everything
else seems okay.
CAPCOM Roger.
INTREPID That's tricky, that looks like a small
(garble)
INTREPID Tell is that anything expected?
INTREPID What's that?
INTREPID That's OPS position right there.
INTREPID Okay, that's good. You want
me to check that again?
INTREPID Yea, check mine to make sure it's locked.
INTREPID Yea, it's locked.
INTREPID Okay.
INTREPID (garble) is okay. Let's do that.
INTREPID (garble) and we will shut off the
descent H2O.
PAO That is a Pete Conrad laugh.
INTREPID And water off. H2O is off.
INTREPID Okay, commission mike.
INTREPID Good.
INTREPID Yep.
INTREPID Dead band up?
INTREPID yea.
INTREPID (garble) that's why I got a clear.
Don't have my sun visors.
INTREPID Okay, let me get your helmet for you.
INTREPID Stay right where you are.
INTREPID Okay. Watch your head. Watch your
snaps that sounds pretty good. Everything is so light under
this helmet. (Garbled). Out there in the (garbled)
is a little bit tougher. Okay.
INTREPID My fan is running.
INTREPID Is that side UP?
INTREPID I don't know, no it's not.
INTREPID This came on.
INTREPID Turn it off.
INTREPID I can hear it, hear it spin up?

INTREPID Yes. Remember when we talked about
that one?

INTREPID Yep.

INTREPID If you went up with my helmet on.
That water in your suit is making your helmet fog a little
bit.

INTREPID Take my helmet off a minute.

INTREPID Okay.

INTREPID Put your hand over the back of my neck
and see if you can feel it.

INTREPID No. No. Right there on the back of
the neck ring.

INTREPID Can't feel my own either, though.

INTREPID I can feel air blowing out, you hear
it?

INTREPID Can't you feel air blowing out of that?

INTREPID No, is it hitting your neck?

INTREPID Huh?

INTREPID Is it hitting your neck at all?

INTREPID No.

INTREPID And this side go out huh?

INTREPID Yea, right there.

INTREPID Hey, Houston didn't somebody tell me
that these T-TABS might not go out until you get your
helmet and gloves?

CAPCOM Intrepid, that's affirmative. Go
ahead and button up, put the helmet and gloves on and turn
on the fan and vent light should go out.

INTREPID Give me the helmet (garble)

INTREPID It's never not worked you know.

INTREPID I have no idea how you got that on there
probably blowing all this moisture out.

INTREPID Yea, you want to wipe it again?

INTREPID Yea.

INTREPID Better.

INTREPID Okay, 1 thing let's turn this valve
right here up a little bit. Where's the helmet bags?
here.

INTREPID Go.

INTREPID I have this snicky suspicion.

INTREPID What.

INTREPID That fan is not running like it should.

INTREPID You will have to wait until you get
your gear on, let's see.

INTREPID Yea, I know. This happened to me once
before. Somebody left a peice of paper in the PLSS. LIOA
cannister.

INTREPID You checked that. It's a beauty.

INTREPID It would be mighty unhappy.

INTREPID Okay, you do this.

INTREPID (garble) wipe yours off.
INTREPID I didn't wipe it off good.
INTREPID Okay, leave that there.
INTREPID Put another one of those on?
INTREPID Yea, Okay?
INTREPID Turn this way and let me check that
other LiOH cannister.
INTREPID Open that thing up, pull that cannister
all the way out of there. Look in there, make sure there
isn't something in there.
INTREPID Okay.
INTREPID That's exactly what happened the last
time.
INTREPID Nothing.
INTREPID (garble) put the cannister back in and
lock the door.
INTREPID Locked.
INTREPID That a boy.
INTREPID Just a second.
INTREPID Locked good and tight now.
INTREPID Okay.
INTREPID Okay I am going to do this the other
way around Al, I'm gonna get my gloves on first, helmet
last.
INTREPID (garble) try it this way this time.
INTREPID Very good. Look pretty good.
INTREPID Okay. Sit down and rest this trip.
INTREPID Okay, let's - hey the vent light went
out. Look at this (garble) Everything is working.
INTREPID Everything looks good Houston.
CAPCOM Roger, Intrepid.
INTREPID Check the helmet there will you Al?
INTREPID You bet.
INTREPID Not locked.
INTREPID Locked.
INTREPID Okay.
INTREPID Get your gloves out.
INTREPID Okay, no wait a minute.
INTREPID And yours.
INTREPID Let me pick it up for you.
INTREPID It is right over here under you -
right there.
YANKEE CLIPPER Houston, Clipper.
CAPCOM Clipper, go ahead.
INTREPID You want to get your EV probe out of
the way or leave them right where they are?
INTREPID No, just leave them right where they
are.

YANKEE CLIPPER (garble)
INTREPID (garble). Do you want to put the
window heaters on?
INTREPID Un huh. Can't lock it.
INTREPID Better put them on for a while before
you get out.
INTREPID Okay, that's what I will do.
INTREPID Hey, Houston.
INTREPID (garble) put it on your head.
INTREPID Reach back there just a second - I'll get it.
CAPCOM Clipper understand, you want to know
which camera to be using on the next pass, is that affirm?
YANKEE CLIPPER (garble)
INTREPID The picture of the Lunar surface.
CAPCOM Copy. Stand by.
YANKEE CLIPPER (garble)
CAPCOM Dick, let's go with the color exterior.
INTREPID And we're gonna check that.
YANKEE CLIPPER Say Houston.
CAPCOM Dick go with the color exterior for the
next pass. Color exterior.
YANKEE CLIPPER Okay, understand. Thank you.
INTREPID (garble)
INTREPID Will do, Pete. Will do.
INTREPID I'll get all buttoned up.
INTREPID Looks fine, let me pull your bottom
ones down a little bit.
INTREPID Yea, that a boy.

END OF TAPE

INTREPID That's fine. If you'll pull your visor
down a little bit.
INTREPID Yea.
INTREPID That a boy. Okay, then you got - -
INTREPID Okay. Let's leave me gloves off until I
get your helmet's visor on.
INTREPID All right. Your helmet. Hand me that and
I'll hold it for you. There you go. Let me slide that on
my head. I'll hold it up. Let's go - no, no. Oh, wait a
minute.
INTREPID (garbled)
INTREPID (garbled) Looks good. What do you think?
Hold - hold - hold that thing there just a second..
INTREPID Dick.
INTREPID Wait a minute. Yes, I checked that for
you. Okay?
INTREPID Okay. Skipper.
INTREPID There you go.
INTREPID Okay. Hold up your pressure. Hold up your
pressure - wait a minute, let me get all this out first.
INTREPID Out and about.
INTREPID There you go.
INTREPID Okay.
INTREPID Okay. Where do we go next.
INTREPID Okay. We need a set of gloves.
INTREPID Okay.
INTREPID Now just let me turn real slow.
CAPCOM Yankee Clipper, Houston. One minute to
LOS. And we'll be giving you a P22 pad at AOS.
CAPCOM Yankee Clipper, Houston. 30 seconds to
LOS.
CLIPPER Bye, Houston. See you next pass.
INTREPID Bet you can tell (garbled) cause I can
hardly get me fingers down them.
INTREPID Before you cover your wrist let me check
your lock. You check mine.
INTREPID Okay. Just a second.
INTREPID Okay.
INTREPID (garbled), Pete. Did you lock.
INTREPID Just a minute.
INTREPID Let me see it. It looks good. Here, look
at you.
INTREPID Okay.
INTREPID Good enough. They're okay, Pete. Wait - let
me see that. Okay. Look down there.
INTREPID Gee. Okay now. Hold the phone. Let's
see.
INTREPID Give you a shot of cold water, here.

INTREPID Yes.
 INTREPID I did the helmet bag and hand bag BA and they are already there.
 INTREPID Okay. Let's get a shot of cold water and then we'll turn off the pump
 INTREPID Okay.
 INTREPID Here it comes.
 INTREPID Okay.
 INTREPID It'll chill down and leave it on for a second.
 INTREPID That it?
 INTREPID That's it.
 INTREPID Okay. DB 16 ECSM CG pump open. Open.
 INTREPID Just a minute. Let me disconnect yours.
 INTREPID Okay. May have to turn this way. That it.
 INTREPID Okay.
 INTREPID Now let me get your's.
 INTREPID Okay. Let's - hold that a second.
 Yeah, now I got to hook up your's. Put it right over the top. Okay.
 INTREPID Thank you
 INTREPID (garbled)
 INTREPID Thank you. Hang on to your water hose, here.
 No. The right hand. That a boy. Okay?
 INTREPID Thank you.
 INTREPID (garbled)
 INTREPID Blocks still in?
 INTREPID Yes sir.
 INTREPID Okay. The blocks are in.
 INTREPID Could still be further.
 INTREPID (garbled)
 INTREPID You kind of wrapped your's up there on the wall.
 INTREPID Yep, yep. While you're doing that, I'll get this in.
 INTREPID I'm afraid I can't do it with you standing there. I really have to wait till you turn around.
 INTREPID Okay.
 INTREPID Put your's in there.
 INTREPID Okay.
 PAO Based on Dick Gordon's report we now believe Intrepid to be on the northwest rim of the Surveyor crater, approximately 600 feet from the Surveyor.
 INTREPID Back off into your corner.
 INTREPID Okay.
 INTREPID Can we get up on the step a little bit.
 INTREPID This one.
 INTREPID You want me to close it?

INTREPID Sure.
 INTREPID Turn around.
 INTREPID Okay.
 INTREPID I wonder if I need to get the water in
 there. Maybe you could do that.
 INTREPID Okay.
 INTREPID (garbled)
 INTREPID Will do.
 INTREPID In a second. Got it.
 INTREPID Okay.
 INTREPID You got the window heater on over there?
 INTREPID No.
 INTREPID Well, I'll have to wait till you turn around.
 INTREPID Let's - how are you doing over there?
 INTREPID Good. Just about got it done.
 INTREPID Okay. I turned on your window heater just
 a second.
 INTREPID All right. Feel good.
 INTREPID Get in your corner again. I don't know
 about you but my suit is collapsing around me. How about
 you?
 INTREPID That's right.
 INTREPID Huh?
 INTREPID Yeah, So's mine. The cabin pressure must
 have pumped a little. Its the last breaker in the upper
 left. Okay. Now, verify. - wait a minute -
 is your (garbled) tied down?
 INTREPID Mine's okay.
 INTREPID All those new connectors locked?
 INTREPID Check mine. I'll check your's. I looked
 at your's okay.
 INTREPID Clocked. That one clocked. Clock.
 They're vertical. You got the burner valves vertical.
 INTREPID Yes sir. Your (garbled) valve is vertical.
 Everything looks locked here.
 INTREPID (garbled) Make sure the water locked. You
 got the water locked.
 INTREPID You don't have a lock on your water control.
 INTREPID (garbled). Do you?
 INTREPID Oh, it's locked.

END OF TAPE

INTREPID Hey, here's one that doesn't have a lock locked.
 INTREPID Okay.
 INTREPID Let's give it a squeak. Hey, what am I hung
 under? That's okay.
 INTREPID Okay?
 INTREPID I think we ought to get over here where
 we turn on the oxygen.
 INTREPID That's right. There is a warning
 tone for press, or something. (garble) PLSS 02 ON. Over to
 press.
 INTREPID Now wait a minute.
 INTREPID Excuse me. PLSS diverter - MIN.
 INTREPID Okay. PLSS pump on.
 INTREPID Let me read that thing. Okay. Let's get
 the oxygen.
 INTREPID Okay.
 INTREPID Wait a minute. Get your pump ON.
 INTREPID There we go. Diverter MIN. Press Reg.
 A and B DRF. Okay - got that for size.
 INTREPID Okay. There you go.
 INTREPID Okay.
 INTREPID Now press 02 ON.
 INTREPID Okay. (garbled).
 INTREPID That's a good idea.
 INTREPID There you go.
 INTREPID We've got an 0 flag and tone on and
 let's do the CB configuration while we wait.
 INTREPID I don't think we can both turn around
 at the same time.
 INTREPID Okay. Go ahead and check yours and
 I'll check mine.
 INTREPID How's your window doing?
 INTREPID It cleared up.
 INTREPID That suit was really clamped
 down around me.
 INTREPID Yes.
 INTREPID TV looks pretty good.
 INTREPID Okay. Let me check mine.
 INTREPID And I'm setting at 38.
 INTREPID Okay.
 INTREPID Okay. Looking good.
 INTREPID (garble) Press up.
 INTREPID Coming on up.
 INTREPID You want to do the (garble) check, now.
 INTREPID Yep.
 INTREPID Okay.
 INTREPID Feels good in the 1/6 G, doesn't it?
 INTREPID Yes, except I noticed that the slight slope
 that we standing on, I keep falling in the back.
 INTREPID I think I'll turn my oxygen on.
 INTREPID Coming up.

INTREPID Those rocks have been waiting 4-1/2
billion years for us to come grab them.

INTREPID Think so, huh?

INTREPID Let's go grab a few.

INTREPID Heck yes.

INTREPID Get an ALSEP out first.

INTREPID Okay.

INTREPID Run the old check -

INTREPID Okay. Mine's holding real good.

INTREPID You got a good tight suit?

INTREPID Yes.

INTREPID And the tone came on so we're ready
to have the oxygen off. We've got a good tight suit.

INTREPID Houston. Are we go for EVA?

CAPCOM Stand by, Intrepid. We'll be right
with you.

INTREPID Okay.

INTREPID Stand by? You guys ought to be
spring loaded.

CAPCOM Intrepid. You're go for EVA.

INTREPID Got the reset valve closed?

INTREPID Just a second.

INTREPID Easy does it.

INTREPID Cabin repress.

INTREPID Closed.

INTREPID Okay.

INTREPID Dump valve open in AUTO at
(garble)

INTREPID Okay.

intrepid Easy does it.

INTREPID Got it open?

INTREPID Let's see. It moved a little
bit.

INTREPID Kind of give me a push back, Pete.

INTREPID Why don't you let me get it.

INTREPID Yes.

INTREPID Stand up. Stand back. I got it.

INTREPID The block's in the way here.

INTREPID Why don't you - wait, let's - you're
going to tire yourself out doing that.

INTREPID Let me get it. That a boy.

INTREPID Okay. That's it. Going down.

INTREPID Okay. (garble)

INTREPID Okay.

PAO Copy 35.

INTREPID Let me see. Standby check gage at
drop below 4.8.

INTREPID Sure doesn't.

INTREPID Mine's up in the overhead someplace.

INTREPID Have you got a (garble)

INTREPID No.

INTREPID Verify cabin at 3-1/2, suit circuits
at 3-1/2 to 4.5 and I think there's 4.2.
INTREPID PGA data 4.8 and it's delay. Okay.
Houston. We're going to open it all the way here. How
about you?
INTREPID They said go.
INTREPID Okay.
CAPCOM Roger, Intrepid. It looks good here.
INTREPID That's it, Pete.
INTREPID Feels good.
INTREPID You bet.
INTREPID When do we turn on the water?
INTREPID Just as soon as we get this thing
down real low.
INTREPID I've got a tone.
INTREPID That's right.
INTREPID An H2O flag.
INTREPID That's good. Both suits.
INTREPID Go 1 pound on the cabin.
INTREPID Okay.
PAO The EVA clock started at 1150802,
elapsed time.
INTREPID How does it look?
INTREPID Go to about 2/10ths.
INTREPID Let's give it a go.
INTREPID Okay.
INTREPID Not quite. Let it sit for awhile
here.
INTREPID We're at about a 10th now; give me a
little push down.
INTREPID Down?
INTREPID Yeah.
INTREPID How are you doing?
INTREPID Oh doing great; just waiting for the
pressure to get low enough to open the hatch.
INTREPID You can reach that upper left hand
corner and you can -

END OF TAPE

INTREPID How you doing?
INTREPID Oh, just great. Waiting for the pressure
to get low enough to open the hatch.
INTREPID You can reach the upper left hand corner
you could peel it.
INTREPID Easy, easy does it.
INTREPID There you go.
INTREPID Got it babe.
INTREPID Okay, the hatch is open now. Okay.
INTREPID Let me reset the del.
INTREPID Okay. Wait a minute. I'll hold it.
Pull her open again.
INTREPID I think I got it.
INTREPID Okay, I got the hatch. Go ahead and
reset the valve.
INTREPID Okay, now what I need to do is get
some water going in. Do you stand up.
INTREPID Okay. Good shape.
INTREPID All right. Leaning against me.
INTREPID Okay.
INTREPID The feed water OPEN.
INTREPID Okay. Let's get it going.
INTREPID Lines ON. Lines on 3.
INTREPID Okay.
INTREPID Immitator 2.
INTREPID Okay, while we're doing that rest until
cooling's sufficient verify PTA stable at 3.7. Mine's still
up ther at some herandus number. (both talking at once)
no wonder I can't move.
INTREPID They're down.
INTREPID LM's suit circuitery 6 to 4.0. It is
4.1.
INTREPID Good.
INTREPID And 4.3.
INTREPID PWEA status. You should have an ascent
press light of 3 amps and an ECS for exactly what we've got
and H2O set component light on. Okay. Biting enunciator in
numeric gim. Okay. PB 16, PV closed.
INTREPID All right.
INTREPID Do that.
INTREPID I'm going to turn around.
INTREPID Okay.
INTREPID Closed. If you'll just hold still
a minute and you're going to have to turn around and get in
the corner and bend over and I'll get your antenna up.
INTREPID All right.
INTREPID Easy.
INTREPID You done?
INTREPID Yep. Okay. Bend over. Can you bend
over?

INTREPID Okay.
 PAO Hatch open 1151037.
 INTREPID Wind the antenna up.
 INTREPID Okay.
 INTREPID Is yours up.
 INTREPID Okay.
 INTREPID Wait too.
 INTREPID Garbled.
 INTREPID Why don't you put those lighting enunciators together.
 INTREPID Okay. If you'll back into your corner so I can turn around here. Okay. I'm finding it the other way around. In an airplane I walk flat footed, in here I'm standing on my toes all the time. There's a pretty good vacuum. Wonder how long it's going to take this boiler to get going.
 INTREPID Garbled
 INTREPID Nope. Then there's yours. I'm just two layer and they'll be okay. There goes the hatch.
 INTREPID Oh, Oh. Let's get that baby. Get it.
 Okay, I'll hold it open.
 INTREPID Yeah, because that water is leaking in -
 INTREPID Yeah.
 INTREPID Grabled.
 INTREPID Yeah, let's hold it all the way open while (garbled).
 INTREPID Hey, my boilers on the line.
 INTREPID Yeah, mine's coming up too. Feels real good.
 INTREPID Let's see, I can go to intermediate flow, huh.
 INTREPID Good finish to start.
 INTREPID It's in intermediate. I'm ready to go over the sill.
 INTREPID Just a second.
 INTREPID Got my checklist.
 INTREPID It's by the ledge, and come on, baby.
 INTREPID Put the LEC and the MESA down. (Garbled) and all that good stuff.
 INTREPID Just a second, pull the door all the way back, want me to hand you something.
 INTREPID Can you go out, and then I'll hand it to you.
 INTREPID Yes.
 INTREPID In about a minute.
 INTREPID How am I doing? Am I hanging on to something here? I get the feeling I'm stuck under something here.

INTREPID You're bumping into the purse there.
INTREPID I'm over it.
INTREPID Purge? I did the purge.
INTREPID Okay. Now you're in good shape.
INTREPID Okay.
INTREPID Go straight down from where you are.
INTREPID Okay.
INTREPID Good, that's good.
INTREPID Okay.
INTREPID Doing good. You're headed right square
out the hatch. You'll have to bend over more, though.
INTREPID Wait - wait - wait -
INTREPID Jump forward a little.
INTREPID Go to your right.
INTREPID Yes.
INTREPID Very good, now go. Get that little -
INTREPID I've got to kneel down a little more.
INTREPID (garbled) I'll push you if you don't
mind.
INTREPID What am I hung on?
INTREPID Nothing, you're okay.
INTREPID Got this garbage bag in my way.
INTREPID Okay.
INTREPID You're headed out the door. Looks real
good.
INTREPID Okay. Okay, I'm down the porch.
INTREPID Just a second, gang, let me pull up.
INTREPID (garbled)
INTREPID Deploy the MESA.
INTREPID Did you?
INTREPID I'm having a tug with that handle.
Down the other steps.
INTREPID Pete, while you're doing that, let me
get the LEC ready for you.
INTREPID (garbled)
INTREPID The handle's in there like something
I never saw before.
INTREPID How is the lock joint? Can you get the
lock out?
INTREPID Yes.

END OF TAPE

CONRAD something I never saw before.
BEAN How's the lock doing? Are you going
to get the lock out?
CONRAD Yes. Now that's better. I couldn't
get the handle out of the deal. I just pulled the cable
releases down.
BEAN Okay.
CONRAD There you go.
PAO TV starting to come in.
BEAN (garbled) and take this with you.
CONRAD Hey, I'll tell you what we're parked next
to.
BEAN What?
CONRAD We're about 25 feet in front the
Surveyor, (garbled).
BEAN That's good. Is where we wanted to be.
CONRAD I bet you when I get down to the bottom
of the ladder, I can see the Surveyor.
BEAN Roger, we though you wanted to take
this with you, Pete.
CAPCOM Sounds good, Pete. Just like you
wanted.
CONRAD Just swing her out here. That's right.
BEAN Okay, now hold it there just a second,
Pete.
CONRAD Okay.
BEAN One second.
BEAN Do you have any TV, Houston?
CAPCOM Roger, we've got a TV. No Pete Conrad
as yet.
CONRAD No, I'm at the top of the ladder.
Okay, now look this thing is all the way under the (garble)
How do you want me to do it? This way?
BEAN Just keep to it.
CONRAD Huh?
BEAN Adios.
CONRAD No, but this thing isn't all the way
out of the - I told you. Here, let me have this end of it.
Let me come back up the ladder a notch.
BEAN Okay.
CONRAD Atta boy.
BEAN Which end is that?
CONRAD Which end do I want? This is the end I want.
BEAN There you go. There we go. Look at
that stuff go. (garble)
CONRAD Yes. Wait a minute. Looks like we
got 900 feet of this stuff.
Bean Hey, just a second. Don't go down yet.
I've got to get my camera on you, dude.

CONRAD I can't go down yet anyhow. I got a -
whoop. (garble) see all the way down. Okay.
BEAN There you go.
PAO That's the lunar equipment conveyor
swinging in the screen there.
CONRAD All right. I really can't figure out
what kind of a snarl I've got here.
CONRAD Hey, Al.
BEAN Yes.
CONRAD Can you look out your window?
BEAN Sure. All right. Let me go see what's
wrong. What's the problem?
CONRAD Oh, that LEC came out of the bag in
3 pieces (garble) well imagine, I picked the wrong piece.
BEAN Do you want me to pull it back in and
throw you the end?
CONRAD No, that's not the problem.
BEAN It's no trouble.
CONRAD I got it right now. They aren't kidding
when they say things get dusty. Whew. I'm headed down the
ladder.
BEAN Okay, wait. Let me get the old camera
on you, Pete.
CONRAD Man, is that a pretty looking sight,
that LM.
CAPCOM You're coming into the picture now,
Pete.
BEAN Okay. Okay, got the old camera running.
CONRAD Okay. Down to the pad.
BEAN Okay.
CONRAD Whoopie! Man, that may have been a
small one for Neil, but that's a long one for me. I'm going
to step off the pad. Right. Up. Oh, is that soft. Hey,
that's neat. I don't sink in too far. I'll try a little -
boy, that sun's bright. That's just like somebody shining
a spotlight in your hands. I can walk pretty well, Al, but
I've got to take it easy and watch what I'm doing. Boy, you'll
never believe it. Guess what I see sitting on the side of
the crater. The old Surveyor.
BEAN The old Surveyor, yes, sir.
CONRAD (Laughter) Does that look neat. It
can't be any further than 600 feet from here. How about that?
CAPCOM Well planned, Pete.
BEAN Okay, I've got a little chore to do
here, right.
CONRAD Say again?
CAPCOM I say that was well planned, Pete.
CONRAD Yes, just a couple of months for a
lot of people. Let's see, deploy the LEC and the MESA. That's

CONRAD done. Looking at my mobility. (garble)
shift. I have the decided impression I don't want to move
too rapidly, but I can walk quite well. That Surveyor really
is sitting on the side of the steep slope. I tell you that.

END OF TAPE

INTREPID I have the decided impression I don't want to move too rapidly. But I can walk quiet well. The Surveyor really is sitting on the side of a steep slope, I'll tell you that. Okay, no (garble) continue to sample. Got to walk real careful Al.

INTREPID Okay.

INTREPID Can you see me alright?

INTREPID Not yet. I went to the back of the window for just a check.

INTREPID (garble) move in a hurry.

INTREPID As you might suspect from some of the pictures Neil brought back. I have a double small rock sitting out in front of me that have a neat amount of dirt built up around them. I'm not sure that my descent engine didn't blow them there. But then again, it may not have.

CAPCOM Roger Pete, copy that. Is the dirt built up on the side closest to the LM?

INTREPID Well let me - I'm going over to get my 2 biggest examples and I will get one of the rocks in the sample and yea, as a matter of fact it is built up on the side that the LM landed on. Let me get it.

INTREPID Oh there is one stoop. Heres another with some more rocks in it.

INTREPID That is dirt just like the one sixth G airplane, Al.

INTREPID Fly up in the air.

INTREPID Chasing it around, boy I will tell you know this is just somebody has got a super rate spotlight - here's another very good looking rock whoops. There is another rock, I want to get it. I think that's just about enough don't you?

INTREPID Looks there's one big rock, it is too pretty to pass up. No I may not be a hog, it won't fit. I'll go over here and get this other one though.

INTREPID Boy you sure lean forward, Pete.

INTREPID Hey lean forward, I feel like I'm gonna fall over in any direction.

INTREPID Your leaning about ---

INTREPID Hey Houston, one of the first things that I can see, by golly is little glass beads. I got a piece about a quarter of an inch in sight and I am going to put it in a continously sample bag. I think I can get it, I got it. Am I really leaning over, Al?

INTREPID You sure are. (garble)

INTREPID Huh?

INTREPID I know that you would fall over leaning that far.

INTREPID It seems a little weird, I'll tell you. Don't think your gonna steam around here quite as fast as you thought you were.

INTREPID I'll tell you, your boots are digging
in the soil quite a bit. If you don't pick up your feet
your really kicking. Hold it dead ahead of you. Your left
foot has a big mound ahead of it right now just pushing along.

INTREPID Uh oh, do I hear a tone?

INTREPID Yea, I've got a H20.

INTREPID You do?

INTREPID Yea, I wonder why?

INTREPID Hey Houston.

CAPCOM Al, verify Pete's water on.

INTREPID It's been on.

INTREPID It's still on.

INTREPID Boy do I think and wow

INTREPID Feed waters on and still real cool in
here.

CAPCOM Al, diverter valve to minimum.

INTREPID Okay, it is minimum now.

INTREPID What do you think I may have done,
broken through the sublavator or something.

CAPCOM That's affirmative, Al.

CAPCOM We have a good shot of you there Pete.

INTREPID Okay, well I'm gonna start back. Take
this baby apart. While I am doing that Houston.

CAPCOM Go ahead.

INTREPID (garble) I didn't dig any crater at
all.

INTREPID Al, you really got to watch your step
down here.

PAO He is removing the thermo cover from
the mesa.

INTREPID (garble) this is mesa. Things that
I have seen before.

INTREPID Didn't hardly stroke the gear at all
and it looks like we were - looks like I ran it just about
vertical. Oh - just like Neil and (garble) said, Al, when
you put on a little slope, and tend you to keep on going.

INTREPID Almost fell over.

INTREPID Would you believe it, the mesa is too
low for one.

CAPCOM Al, how does the feed water look now?

INTREPID Well I still got an A in there, but
I'm plenty cool and went back to minimum and sitting here
at minimum. What do you think happened.

CAPCOM Al, we would like to watch it a little
bit, it could be instrumentation. Stand by.

INTREPID Okay.

INTREPID How long have I been out Houston?

CAPCOM Pete, you've been out 25 minutes and
your about 4 minutes ahead.

APOLLO 12, MISSION COMMENTARY, 11/19/69, CST 05:45, GET 115:23 309/3

INTREPID Okay, I got the table out, testing
the mesa am setting up the ACB at this time (garble) very
nice. Very Nice. Hey, Al.

INTREPID Yep.

INTREPID I could work out here all day, just
take your time.

INTREPID Almost too cold on intermmmediate, I'm thinking
seriously of going to N. Here's some coloring chart.

INTREPID Dump de dump dump dump. Dump de dump
dump dump.

INTREPID Tray is right side out.

INTREPID No that's not ready.

INTREPID Nope.

END OF TAPE

BEAN No that's Monday. Nope.
CONRAD I think our next big surprise, Al, is getting
this thing up.
BEAN Getting what up?
CONRAD These (garbled)
BEAN Oh. Is that right?
CONRAD We'll see what happens.
BEAN Okay.
CONRAD How's your water?
BEAN Oh it still shows on A, but its cool. It
may be instrumentation.
CONRAD Let's hope so. Just beginning to warm up
to this task.
BEAN LCG water pump sounds like a diesel truck
running out here. Comforting to know that its running. I'm
off to get the battery.
CONRAD Okay. I think I know what happened, Houston.
I think I know what happened.
CAPCOM Pete, go ahead.
CONRAD Ah. What did you just do, Al?
BEAN Man, I just figured it out.
CONRAD I sure did. You just blew water out the
front of the cabin. Ice crystals.
BEAN That's what had happened to the tip, its
in. The door isn't thrown shut like it did before and it
probably bothered the sublimator because it wasn't in a good
vacuum anymore.
CONRAD Uh huh. So?
BEAN The door is probably going to start
working in a minute.
CONRAD I sure hope so. When you opened the door
that thing shot iceballs - (garbled).
BEAN Yes. There's probably going to be - all
for my - never thought you'd have to do that.
CONRAD Yes. You bent the outside of that front
hatch on the way out. You tore some of the skin.
BEAN How did I do that?
CONRAD I don't know. But they your (garbled).
BEAN (Garble) right along the way out
CONRAD Sorry about that.
BEAN I thought it would be simple.
BEAN Houston, Al. It's looking better.
CONRAD I didn't realize that the hatch could close
quite so tightly like that because when I was working on the
other side of the cabin, the hatch went closed and I didn't notice it,
and apparently there is holding a good vacuum in here. My H2O flag
is off now so everything is copesetic.

CAPCOM Roger, Al. It looks good down here.

BEAN Okay.

CONRAD Okay. I've got both canisters, Al, both batteries. As soon as I get them in here, I got to pack the contingency samples.

BEAN Okay.

CONRAD (Garble) Lightweight (garbled).

BEAN Okay, but just - I tell you, you just can't move as fast as I thought you could. You got to take it real easy. It's a feeling that I'm most tippy on the balance up here.

CONRAD Help.

BEAN Let me help you.

CONRAD Man, did I get dirt all over myself.

CONRAD This is what is known as dirt, dirt.

BEAN Let me know when you start heading back out there to duty. I'll get a good shot of you, Pete.

CONRAD Getting ready to do it in a second as soon as I get the bag. I got the contingency sample in the bag.

BEAN Okay.

CONRAD I've got everything else, (garble) battery, canister and I just have to hook up the LEC. I tell you one thing, we're going to be a couple of dirty boogers. (garble) Why don't you take up a little slack, Al.

BEAN All right.

CONRAD Just a little. It works. I'll tell you. This is dirt dirt.

CONRAD That's the greatest.

BEAN What's that?

CONRAD My end of the ETV just came out of the metal slot. Somebody that made this can didn't make it like all the training units, they made it littler so it came out. I caught it as it was going by. You know this metal pin that goes all the way through?

BEAN Yes.

CONRAD Unfortunately, it's smaller than the metal holder. Kind of interesting.

BEAN Wait, wait, wait wait. Okay.

CONRAD I can't keep it in the slot.

BEAN Wait just a minute. Okay, now.

CONRAD Hold the phone a second. You can, wait, wait. There we go.

BEAN (laughter)

CONRAD Wait till I get in this shadow. Because I can't see what I'm doing. I'm about to fall down in a crater hole. Oops. Bright. It really does -

BEAN You'd better get over here in the shadow.

CONRAD Okay, I'm in there. Oops, another crater hole.

BEAN It's a regular obstacle course over there.

CONRAD Man, am I going to get dirty. Hold it now. Back up a little ways.

CONRAD Tell me if it's clear of the porch rail.

BEAN It is now.

CONRAD It is? I can't see a thing, looking into the sun, pull.

BEAN Okay, I'll bring her in
CONRAD Do it easy.
BEAN Okay. Good rig.
CONRAD I can't. Wait a minute. Wait, wait, wait, wait.
Atta boy, now I can see.
CONRAD I'm getting dirty.
BEAN Got it.
CONRAD Okay. I'll just step right back between you and
the flag.
BEAN Okay, let me see. While you're doing that,
what was I supposed to do. Oh, I know, possibly TV deploy.
I'll go work on the tripod. Trying to learn to move faster.
CONRAD Pretty good. Hey, I feel great. How long
we been at it, Houston?
CAPCOM Pete, you're 34 minutes into the EVA and
you're right on the nominal time line.
CONRAD That contingency sample is black.
BEAN You'd better believe it.
CONRAD I may have filled the bag too full.
BEAN Okay, I know what it is.
CONRAD 1 camera, 2 camera's. Come on little fella.
Come on TV camera.
BEAN Okay, ready for you, Pete.
CONRAD Right. Well - I got the strap hooked up to
it. Can you come over here and get it. Here I come.
BEAN Okay.

END OF TAPE

INTREPID All right, I've got to stop what I'm doing. Let me come over here and get it. Here I come. I feel like Bugs Bunny. (Laughter)

INTREPID Take it away whenever you need it.

INTREPID Okay, I'm going right now if I don't fall over it.

INTREPID Sure that was right.

INTREPID Yeah. Let her keep coming. Let me get over to this side.

INTREPID Let's get it over the handrail.

Hold it, hold it right there.

INTREPID I can't see it down in front. Tell me when it's over the handrail.

INTREPID It's over the handrail now. All right. Just lower it real slow. That's a boy. Hold it right there. Okay, stay put. Okay, let her go. That's it, I gotcha. Hold it right there, hold it, hold it, hold it. One - that is 2 - okay, let go, all the way.

INTREPID Okay.

INTREPID All right, LEV possible TV deploy. LMP egress, contingency sample area. Deploy (garbled) and place 70 millimeter on the camera.

INTREPID Okay, be out in a minute. Got to set the camera, and I'll be right out.

INTREPID All right. Let me know so I can photograph you.

INTREPID Okay.

INTREPID Okay, contingency sample 8, that's 8. Eight, 5 (garbled). Sunny.

INTREPID He sampled in quite a few places, Houston, so I'm taking a bunch of pictures.

CAPCOM Roger, Pete. Pete, for your information for those photos, your shadow lines as of right now is about 45 feet on a level plain.

CONRAD Okay, very good. Contingency sample area I got part of the color chart.

BEAN Uh oh.

CONRAD What'd you find, Al?

BEAN Hey, I'm ready to do it.

INTREPID Houston. I don't (garbled) out (garbled). I'm getting ready to scout the front door.

CAPCOM Roger, I'll stand by on that.

INTREPID Hey, wait. I'm going - I wonder if I can get in the bottom of this crater hole.

CAPCOM Al, Houston. The LM is looking good. You're go for egress. Pete, you're at 40 minutes into the timeline, and you're about 4 minutes ahead.

BEAN Okay.

CONRAD Too soon. (Laughter). Oh dear.

BEAN Okay, Pete. Here I come. Wait, wait, wait, wait.

CONRAD You ready now?
BEAN No, no, no, no. Let me come - got to run through this crater. Here I come. Now, wait a minute, LM egress 5 - oops - at 15. I just shambled that color chart. I tried to throw it in the ground, and naturally it went in sideways and it got itself all covered with dirt. You wouldn't know what color it was. Okay, I'm ready for you.

CONRAD Okay, you might want to give me directions.
BEAN All right, yeah.
CONRAD Don't see anything?
BEAN Okay, you're coming straight, out and the further you can bend over the better. All right, move to your right.
CONRAD Okay.
BEAN That a boy. Now, that's it, you have to get your knees down. That a boy. Good shape, good shape.
CONRAD Okay, I'm pulling the hatch closed here.
BEAN Okay. Don't lock it. Okay, you're right at the edge of the porch.
CONRAD Okay.
BEAN Hey, if I'd landed 20 feet behind where I landed, we'd have landed right smack in that crater. Do it.
CONRAD Oh, it's kind of hard to move the door - was just trying to get it.
BEAN There you go.
CONRAD I'm going to try to keep the door open for us there.
BEAN Okay.
CONRAD Pretty good, I'd better get my visor down though.
BEAN Yes sir, afraid that sun is bright.
CONRAD Well, the LM looks nice on the outside.
BEAN Houston, let me ask you a question. How important is that color chart? I tried to spike it in the ground, you know, so it was perpendicular to the sun, and it just didn't do that, and it's all covered with dirt. I can go back and resalvage it if you want to take the time.
CAPCOM Press on with what you're doing there, Pete, and we'll get a answer back to you.
CONRAD Okay.
CAPCOM Pete, press on. No problem.
CONRAD Okay, that a boy. You look great. Welcome aboard. Okay, place - wait a minute - the chart I didn't get, the poor colored chart on under surface didn't make it. Contingency sample area I got and egress I got.
BEAN How about for the S band antenni.

CONRAD Okay. That sun is bright.
BEAN Yeah, take it easy. You really do
begin to adapt.
BEAN You hop a little bit.
CONRAD If you turn around and walk over to
your right a little bit and look over that crater you're
going to see our pal sitting there. That's one steep slope
it's on. Okay, now what have you got all over your boot?
Stop. You picked up a piece of landing gear insulation.
BEAN Okay. Here we go.
CONRAD That a boy.
BEAN Okay, I'm going into -
CONRAD You got to watch it in the shadow.
BEAN Yep.
CONRAD You can't see what you're doing. Come
over here where I am. See that Surveyor sitting there?
BEAN There that thing is. Look at that.
CONRAD Look how close we almost landed to that
crater.
BEAN Beautiful, Pete.
CONRAD Look at the descent engine. It didn't
even dig a hole.
BEAN Okay.
CAPCOM Pete, Houston.
BEAN Houston, I'll need to process -
CONRAD Go ahead, Houston.
CAPCOM Pete, will you give us status on the LM
and also some comments on your boot penetration?
CONRAD Okay, my comment is exactly the same as
Neil's. In fact, every time I get down in one of these little
craters, I sink in a lot further. I'd say our footsteps are
sinking in -
BEAN What'd you do with it?
CONRAD Put it over by the light gear. I've
got to cover that rock box with the craters. Remember, last
minute change. And -
BEAN Hey, wait a minute. You want to present
the next step?
CONRAD Oh, I tell you. I think it's pretty
much the same as (garbled), don't you, Al?
BEAN I do (garbled). It seems to compact
into a very shiny surface. I guess the particles are very
small and very cohesive, so when you - -

END OF TAPE

INTREPID It seems to compact into a very shiny surface; I guess the particles are very small and very cohesive so when you - every footprint, as you look at it, it looks almost like hitting a piece of rubber itself. It's so well defined, you can't see any grains in it or anything (garble). Al, did you find the Earth? Where's the Earth?

INTREPID Oh there it is; I can see it. Hello there Earth. Where is it?

INTREPID Just look at the S band antenna; look up that way; straight up there.

INTREPID That's the best instrument.

INTREPID Okay now; where did we all agree was the best place to deploy this S band; right here, huh?

INTREPID Yeah. A little bit further out.

INTREPID Right out in here is a good spot; hey, I don't want to get too far away from the cable, it's fine right here; it's just right.

INTREPID Okay.

INTREPID Point to Earth.

INTREPID That's what it says.

INTREPID Okay. I'm glad you didn't land back about 50 feet; that's what I'm saying buddy.

INTREPID Ah ha ha (laughter)

INTREPID Hey you can see some little shiny glass, yeah, glass, in these rocks.

INTREPID Yeah - I reported that.

INTREPID You can also see some pure glass if you look around.

INTREPID You can jump up in the air.

INTREPID Hustle boy; hustle. We got a lot of work to do. I've gotta do my fans and in 5 minutes here.

INTREPID What I can do is useful work like getting that TV camera going.

INTREPID Okay - good idea.

INTREPID You really got to be careful when you go out of the light into the dark.

INTREPID Yep. Okay. Move position 23 to K. I got it.

INTREPID This second thing won't come out.

INTREPID Hey, give me a hand here.

INTREPID Yes sir; what can I do for you?

INTREPID That second S band thing won't deploy. Where do you want me to pull the hole?

INTREPID Right here?

INTREPID Down there.

INTREPID Oh - pull away from me.

INTREPID Okay.

INTREPID Okay, never mind; forget it.
INTREPID You did it?
INTREPID No - I don't think it's - let go, let go.
INTREPID Try different -
INTREPID You got it; never mind.
INTREPID That's not right. Didn't that
thing have 2 sections to it?
INTREPID No, never mind; forget it; let's go.
INTREPID Hey Houston; does the inner mast; it's
just one piece, huh?
CAPCOM Copy the question. You want to know
if the inner mast is one or two sections.
INTREPID I just want to know if the inner mast is
one or two sections.
INTREPID Yeah, it seems to me -
INTREPID This is dum-dum, baby. It looks shorter
than it used to look at practice for some reason.
CAPCOM Pete, that inner mast should be 2 sections.
INTREPID It's more than one section - I think so;
you have to pull out the top section intact.
INTREPID Taking this TV table over here by the front porch.
INTREPID Okay. The TV is almost off. It is
significantly easier just to do anything here. Like an arm motion
is so simple because you're not trying to rest the weight like
you are in lg.
INTREPID All set? Ooh - ha ha ha. (laughter) Look
at that; that leg doesn't want to.
INTREPID Go on down leg. (loud laughter)
INTREPID Okay; get that TV down; show everybody. Wait a
minute. Lock inner mast, lock outer mast, extend and lock brakes;
we've got. Align to the moon thermal cover. Okay?
INTREPID Spring lock thermal cover.
INTREPID Goodbye.
INTREPID Okay, Houston; I'm going to do the TV
camera now.
CAPCOM Roger Al.
INTREPID Hey, it's real nice moving around up
here. You don't seem to get tired. You really hop like a bunny.
Where oh where is earth? There it is. You can look at TV.
And up -
INTREPID Boy it works on the S band. Here back -
INTREPID Dum te ta dum dum dum -
INTREPID You can't -
INTREPID Dum ti ti dum dum - there's that.
Look at that go; ha ha ha (laughter). Hey Red, I was gonna
deploy this 20 feet of tin, but because of the sun being where
it is - we are going to have to deploy a little bit more toward

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 1155300 CST 615 312/3

INTREPID the 2 o'clock position.
INTREPID I think that will be okay though.
INTREPID That will give you a good shot; right in here.
INTREPID I'll see if I can keep the stuff from getting in the camera at all.
CAPCOM Al, we have a pretty bright image on the TV; can you either move it or stop it down.
INTREPID Okay, I'm going to have to stop it down.
INTREPID That's as far as it goes; Houston. How does that look to you?
CAPCOM No, it's still looks the same Al; why don't you try shifting the scene?
INTREPID Okay; I'm going - the problem is the LM is very reflective; let me - I got 2 choices. Let me go over here further to the side, and you check and see if it reflects too much, and if it does, I'll have to go stick it in the shade. And then maybe shine at the LM; course that may not be too good either, but it's the best we can do.
CAPCOM That okay Al, and also you might try the automatic light control to the outside.
INTREPID Roger, light control to the "outside."
INTREPID Okay, Al, watch.
INTREPID Wait a sec. Let me check it. How does that look Houston?
CAPCOM Still looks the same Al.
CAPCOM We have a very bright image at the top and blacked out at the - for about 80 percent of the bottom.
INTREPID Ha Ha Ha. Man, did that thing deploy.
Ha Ha Ha Ha.
INTREPID Well, I'll tell you what let me do, Houston. Let me move it around here back, so the back is to the sun, and maybe that'll help; maybe that's the way we're gonna have to do it.
CAPCOM Okay, Al; go ahead.
INTREPID Once we learn the trick here I think we can do it each time. That may do it; that may do it right there Houston.
CAPCOM Al, we haven't seen any change at all; why don't you go and put your glove in front of the lense but not over it, to see whether we can get any change at all.
INTREPID (garble)
INTREPID What do you see now?
CAPCOM Still the same; we've got a very bright part - about 20 percent of the top, and black on the bottom.
INTREPID (garble)
INTREPID Yep. Have any suggestions?
CAPCOM Stand by Al.
INTREPID I'm pointing to a non-bright area, let me point it - it's from the sun here; may be ground problems. Hope it is.

APOLLO 12 MISSION COMMENTARY, 11/19/69 GET 1155300 GET 0615 312/4

INTREPID All the connections look good.
CAPCOM Hey Al, why don't you take a good close
look at that lense and make sure it is in the right configuration.
INTREPID (garble)
INTREPID Okay, I've got it on focus and infinity;
I've got the zoom at 30, the (garble) I put in 75, and I got
the F stop at 22.
CAPCOM Roger Al; we copied.
INTREPID I've got it pointed exactly opposite
the sun here, so -
CAPCOM Al, we see no change at all in the
scene; why don't you just give it a little tap and maybe the
color wheel is hung up.
INTREPID Okay, put this antenna up - (garble)
INTREPID Houston, it won't hurt if my PLSS
antenna hits this S band antenna, will it?

END OF TAPE

INTREPID Hey Houston it won't hurt if my PLSS antenna gets this S-band antenna lowered.

CAPCOM Standby now Pete.

INTREPID Dock first.

CAPCOM Pete that's no problem.

INTREPID Okay.

INTREPID Hey Al.

INTREPID Yeah.

INTREPID Come over here you're going to have to help me line up this antenna - Houston, I'm going to leave the camera just pointed off in the distance. If you get any ideas. I'd be glad to work on it for you.

CAPCOM Roger, Al. Try and put it off where you don't get any reflectance into it and we'll be thinking about it here on the ground.

INTREPID Okay. The cord that runs right into the back of the king D is sort of a white plastic material and it looks like it's cracked and maybe even melted a little bit. It doesn't look typical of that sort of connector.

INTREPID Steer it around to the back. No, No, no. No you got to go around - go around so you can look at the antenna and tell me when I've got it pointed at the earth.

INTREPID All right.

INTREPID No don't get underneath it. Atta boy.

INTREPID Okay.

INTREPID Down. Whoops, see what I mean this thing - you're going to have - really going to have to watch that ALSEP. You could skip over this whole antenna without even blinking at it.

INTREPID Okay, go ahead.

INTREPID Can you see the earth.

INTREPID No.

INTREPID You've got to get around here. The Earth and the sun are right lined up. You have to look right into the sun and look up in the sky.

INTREPID Watch it, you are on the TV antenna (garble) See what I'm trying to do. I've got to pitch over now, right.

INTREPID Uh huh. Oh, here it is. I got you now. Bet we can hide it. Yeah. I'll tell you where you need to go, Pete.

INTREPID Uh huh.

INTREPID Hey, that's good. Now you need to point. You need to rotate the whole thing counterclockwise.

INTREPID That's good. You're getting there - getting there. That old Earth's just hanging up there.

INTREPID Cut me in. How much further?

INTREPID Oh, I'd say another 3 or 4 degrees maybe.

INTREPID Stop. Good boy. Okay, now. Wait. That looks

INTREPID just good as far as angles. Now up and down,
I can move in a little closer right now. Okay, come down
with it.

INTREPID Touching now but hate to come down.
INTREPID Put down. Come on down.
INTREPID Coming.
INTREPID Okay, stop. Now - now go clockwise. All right,
a little more. I think you're pretty close to right on there, Pete.

INTREPID All right, now wait a minute. Don't - don't
let me knock it over, but I guess

INTREPID That's right
INTREPID I'm trying to stabilize it for you.
INTREPID Yeah, but every time you do, you push it in the -
INTREPID Okay, you go ahead.
INTREPID That's difficult to do. It's so tender up
here on this ledge.

INTREPID Have trouble?
INTREPID I don't see the Earth anywhere in the sight.
Too close. Have any ideas which way to go.

INTREPID Drop just right there.
INTREPID I tell you we're going to have to - let's push
these legs in a little bit - get this thing more stable. Get
this thing in the dirt.

INTREPID Okay.
INTREPID Don't break them. That thing is delicate.
INTREPID I knew it.
INTREPID Now because of dirt - Now let's line her up.
INTREPID Can you look right down the MARE.
INTREPID Yeah, it looks like it's lined up to me.
INTREPID Is it enough to track. Did you -
INTREPID Awfully close -
INTREPID That's about it. Look at the altitude and
azimuth and I'll look for its pitch. Get a little bit more clock-
wise.

INTREPID You're right on it, Pete, stop.
INTREPID Yeah. I put it up and down in pitch, we're
bound to get it.

INTREPID That mikes going to pull you away, can you get
it?

INTREPID Yeah, I just about hit it. Hold it.
INTREPID Take your hands off.
INTREPID I can't it'll fall over.
INTREPID No.
intrepid garble
INTREPID You're pulling on it here.

INTREPID No, leave it alone.
INTREPID Okay, I've got my hands on it. It's standing
there.
INTREPID Un huh. Be delicate because this pulls on it.
INTREPID Yeah. Got it?
INTREPID You want me to go work on something else now.
INTREPID Yeah. Okay. Looks good. Just be careful
you don't move it any closer to the right side of your PLSS
it might bump it, Okay?
INTREPID I put out the Solar wind collector. Before
I do let me get a camera out here so I can take your picture
Pete.
INTREPID Get out that solar wind collector.
INTREPID Okay. Earth I ask you again to S-band the
antenna site.
INTREPID Now, what's next?
INTREPID Okay. To me it's solar wind collection.
INTREPID Okay.
CAPCOM Al, when you finish up the solar wind, would
you give one more last try on that camera? Try opening up
the F stop all the way and exercising the zero.
INTREPID I sure will.
INTREPID Well, we sure don't want to cut those cables.
INTREPID Nope, we've got to stay away from those cables,
you're right. Got a camera with you?
INTREPID I certainly do.
INTREPID Okay, just hang on to it.
INTREPID Houston. How long we been up?
CAPCOM Pete. You've been out 1 hour and 2 minutes and
you're both running about 2 minutes off nominal behind.
INTREPID Okay.
INTREPID Looks like a good place for the solar wind
collector, Pete. I think I'll stick it right here. Okay.
INTREPID Where are you?
INTREPID Right here.
INTREPID I'm planting it right here.
INTREPID Okay.
INTREPID Get back on this timeline in a minute.
INTREPID Yeah, let's go boy. I knew we were going to
run late. Ding-a-ling TV didn't help.
INTREPID Okay.
INTREPID Solar wind collector. (Garble)
INTREPID That looks good.
INTREPID Okay, come here, I've got something for you.
Let's go.
INTREPID A hammer, now. Put the hammer -
INTREPID (garbled)

INTREPID Going to hang that TV first?
INTREPID Yeah, yeah. About right here?
INTREPID Okay.
INTREPID Right here's a good spot.
INTREPID Okay. Reduce pressure.
INTREPID Right here?
INTREPID Yeah.
INTREPID Goes right in the ground.
INTREPID Yep, that's no problem is it?
INTREPID No, probe just drags right in.

END OF TAPE

INTREPID It's right in the ground.
INTREPID Yes, that's no problem is it?
INTREPID Those poles just drag right in.
INTREPID Okay. It might blow the whistle on
the TV.
INTREPID Okay, I'll go work on it a little bit.
INTREPID Okay.
CAPCOM Al, we copy your comment on insertion
on that into the ground. How far in are you able to get it?
BEAN Oh, I pounded it in over a foot I'd
say, and it didn't look like it was any harder towards the
end than right at the beginning. It's there.
INTREPID It's pretty - I'll tell you, Al, (garbled)
INTREPID Okay, Houston, I'm going to move the
focus a bit and see what happens.
CAPCOM Roger, Al, don't spend too much time
on it. You're running a tad behind.
INTREPID Okay, well I'll tell you what, I can
feel that the wheels, when I hold the end of the lens I can
feel the wheels running, because I can feel something in motion
inside. Okay, now, I just changed completely the settings
I had before.
CAPCOM Okay, Al, we see no change down here.
(garbled)
INTREPID (Garbled) Okay, let me try another
f stop, the other way. How's that?
CAPCOM There's no change down here, Al. That's
coming in there now, Al. Okay, what change did you make?
INTREPID I hit it on the top with my hammer. I
figured we didn't have a thing to lose.
CAPCOM Skillful fix, Al.
INTREPID I hit it on the top with this hammer
I've got. Yes, that's skilled craftsmanship. Got it up.
INTREPID Hey that - Al, (garbled) has already
cheered this thing. Never touched it.
INTREPID Okay. What should we do now with the
wrench, Houston?
CAPCOM Okay, why don't you give us one more
light rap, and also cut down on the f stop.
INTREPID All right, will do. Now is the zoom
right for you?
INTREPID (Garbled)
INTREPID (garbled)
CAPCOM Al, we're still not getting a good
picture. Why don't you press on and we'll try to get back
to it later if we have time.
BEAN Okay, I'll pound it a little bit. There
you go.
INTREPID All right, just leave it like it is,
bring it slightly toward the LM here and if you do get a

INTREPID picture, say something.
INTREPID There you go now.
INTREPID That ought to give you some sort of a
picture that you can think about. Be glad to come back on
work on it. Got to go to work again.
CONRAD Al?
BEAN Yes sir.
CONRAD What I need is a piece of cake.
BEAN Good luck.
CONRAD Boy, there's all kinds of cake around
here.
INTREPID Okay.
INTREPID They had it, I think (garbled)
INTREPID Houston.
CAPCOM Pete, go ahead.
INTREPID Okay, the flag is up.
CAPCOM Roger, copy the flag is up. We show
you are very close to the nominal timeline. How about an
EMU check?
INTREPID Okay. We have the flag up. Like I
said, hope everybody down there is as proud of it as we are
to put it up.
CAPCOM Affirmative, Pete, we're proud of what
you're doing.
CONRAD Al?
BEAN Yes sir.
CONRAD Can we have a quickie here, okay?
INTREPID Back up a little more and (garbled)
INTREPID All right.
INTREPID Did you get rid of your TV cable?
INTREPID No, I just went right over it,
Pete. (garbled) take a left, Pete.
INTREPID I can't see you.
INTREPID Get it?
INTREPID Sure did.
INTREPID Okay.
INTREPID (garbled)
INTREPID Okay, got you.
INTREPID Okay.
INTREPID Okay, got it working.
INTREPID I'll go get my camera. I got some
pan shots and next the ALSEP. And Houston, I'm down like
mid cooling.
CAPCOM Roger, Pete. How's Al doing?
INTREPID Say again.
CAPCOM Is Al doing all the work?
INTREPID No sir. I'm heading out to do the pan
photographs right now, and with any luck at all we'll get
back on the timeline and complete what we need. The ALSEP and
(garbled) solar wind and I'm hopping out here to the Number 1

APOLLO 12 MISSION COMMENTARY, 11/19/69 CST 0635 GET 116:13 314/3

INTREPID slot.
CAPCOM Roger.
INTREPID Boy, you sure can move on this surface.
INTREPID Yes, but watch it when you hit a rock.
INTREPID (garbled)
INTREPID Okay, go f/11.
INTREPID F/11 it is.
INTREPID Mark, 2, 3, now f/8, 4, 5, 6, 7, 6, 7 -
YANKEE CLIPPER (garbled)
CAPCOM Clipper, you were broken up. Say again.
YANKEE CLIPPER (garbled)
INTREPID Who are you talking to?
CAPCOM Pete, we have Clipper and you both on
the same air to ground. Clipper, go ahead, say again.
CLIPPER Houston, Yankee Clipper.
I marked out snowman with the telescope and we got some
good pictures (garbled)
CAPCOM Roger, Clipper.

END OF TAPE

CLIPPER telescope, and we should get some good pictures.
 CAPCOM Roger, Clipper.
 BEAN Do you hear a lot of background noises, Pete?
 CONRAD Kind of static and things?
 BEAN I keep hearing a whistle.
 CONRAD That's what I hear. Okay.
 CONRAD Okay, Houston, 2 of the pans are done.
 CAPCOM Roger, Pete. Copy. 2 PANS.
 BEAN Al, how was the LM inspection?
 BEAN I'm working on it right now.
 CAPCOM Roger.
 CONRAD Taking a look at that surveyor, Al, I suspect
 we ought to be able to get there quite readily. I'm going to
 head down there by the crater a little bit, but instead of - wup.
 BEAN Watch yourself, it's easy to slide.
 CONRAD You can say that again. I know that you've been
 over here, haven't you?
 BEAN Uh huh.
 CONRAD I don't think this is going to show anything,
 but I'll give it a go.
 BEAN What's that?
 CONRAD Oh, I'm trying to show the front gear here now,
 but it's not bright enough.
 BEAN Give it a go, though.
 CONRAD Oh, oh.
 BEAN What happened?
 CONRAD (Garbled) camera.
 BEAN This pads down.
 CONRAD Could be your plus Y. Bounced about
 PAD diameter.
 CAPCOM Al, do you have any comments on the foot pad
 interaction with the surface?
 BEAN Yes, I do. Actually we - Petes PADS went
 in a little bit further than did Neils; I'd say most of the PADS
 are in about an inch and a half to two and it sort of looks like we
 were moving slightly forward. and that pretty well killed off
 our left, right velocity when we touched down. The right
 hand foot pad seems to have bounced; that'd be the plus Y
 right hand, the others don't seem to have. They must have manage
 to hit there first, rock back and forth or something.
 CAPCOM Roger, Al. Do you see anything on the surface
 from the DPS?
 BEAN No, I don't. The surface under there is
 interesting - the surface under there is clean. It doesn't
 have the loose dust particles that - as does the rest of the lunar
 surface about here. It also has a number of small round dirt
 clods, if you want, they seem to be strolling off in a radial
 direction from underneath the skirt of the engine. I'll take a couple of
 pictures. shots about 8 inches or so off the ground.
 CONRAD I think I can get a good one for you. of Houston
 CAPCOM Roger, Al. It's a good description
 BEAN There we go.
 BEAN Hey, you can really move around out here, Houston,

BEAN That's a mobile pogo ridge that we've got there, and also that one in the centrifuge. Man, it's just like this. It's a real good training device.

CONRAD Where are you, Al?

BEAN I'm over here in back. I'm ready to start to start the ALSEP, also.

CONRAD Okay. I got that free and I'm coming around.

BEAN All right.

CONRAD Okay, Houston, I went back to intermediate cooling.

CAPCOM Roger. We copy that.

BEAN Good idea.

BEAN When you didn't (garble)

CONRAD Hold on a second.

BEAN All right.

CAPCOM Pete and Al you're 1 plus 22 into the timeline and you're running about 6 minutes behind nominal. We're monitoring PLSS feed water 2 as a determining parameter.

BEAN Okay, Houston. We'll start catching up now. We've kinda gotten over the initial check out on how to walk, and move around and maybe - we're having trouble with this hardware like we did with 11.

CONRAD In the antenna.

CAPCOM Roger, and we're showing 2 plus 30 left in the EVA.

BEAN Okay, Pete, your sidebags on.

CONRAD All right, lets go.

BEAN Okay, and we're off to load the ALSEP.

CONRAD We ought to be able to move out with this thing.

BEAN The LM exterior looks real good. The LM exterior looks beautiful the whole way around. It's in good shape.

CONRAD It doesn't look the way it did the day we launched it.

BEAN Right. Okay. Here we go, Pete. Aw. Up they go, babe. One ALSEP.

CONRAD There it is.

BEAN There it is, that's right. It is loaded on the lunar surface.

CONRAD Better go to intermediate cooling, cool down. Okay?

BEAN Hey, it's damp up here, you've got to go easy.

CONRAD Sure do.

BEAN Coming right up.

BEAN Widen that out on the boon, Houston. Sure looks pretty.

CAPCOM Roger, Pete. We copy

BEAN (garbled) Pete. It's a good shot. I haven't had anything quite so tremendous.

CONRAD (garble)

BEAN Maybe we can (garble)

END OF TAPE

CAPCOM Yankee Clipper, Houston. OMNI CHARLIE,
ONMI CHARLIE.
INTREPID (garbled)
INTREPID Say again.
INTREPID (garbled)
INTREPID Okay. Yankee Clipper sure is coming
through.
INTREPID I hope so. Okay, push that toward me.
INTREPID What (garbled)
INTREPID I don't know.
INTREPID Hey, Al, (garbled)
INTREPID Very good, Pete.
INTREPID (garbled)
INTREPID Thank you.
INTREPID Okay, lift your left foot up and you're
okay.
INTREPID Okay.
INTREPID (garbled)
CAPCOM Yankee Clipper, Houston. High gain
antenna pitch minus 13, yaw 225.
INTREPID Hey Houston, do you hear this constant beep
in the background?
CAPCOM That's affirmative. We've heard it now
for about the past 45 minutes.
INTREPID What is it?
INTREPID That's right, so have we. What is it?
CAPCOM Intrepid, we've tried to isolate it. It
appears it's something on the downlink where it coming from
the LM.
INTREPID Hey, Al, (garbled)
INTREPID This lunar jewel is all set up for you,
fellow.
INTREPID Okay.
INTREPID You ALSEP's doing okay. (garbled) will be
happy to know (garbled) show it up for him here.
INTREPID That's all right.
INTREPID here you go.
INTREPID Now what do you need at the end?
INTREPID I need everything you've got. (garbled)
INTREPID How about this? You need that one? How
about the (garbled)
INTREPID Yes, put that on. Why don't you put that
in a package, too, and I'll pick up later.
INTREPID It's already in (garbled)
INTREPID (garbled) Okay.
INTREPID Okay, I put that there.
INTREPID (garbled) needle and move it over (garbled)
INTREPID All right.
INTREPID Got to put this together right - where's
the arrow? We've got to let down the cap while we wait.

INTREPID Wait a minute. Okay, go.
INTREPID Okay.
INTREPID Put this together.
INTREPID Houston, we're going to go ahead and
put down the down the fuel cast right now and then I'll take the
filament out of it.
CAPCOM Roger, Al, copy you're working with the
fuel cast.
INTREPID Wait, wait, wait, wait, wait.
INTREPID I knew it. This is such a bad place to
put it, Pete.
INTREPID What?
INTREPID That's a bad place to put it.
INTREPID Yes.
INTREPID The fuel cast comes down beautifully in
position. Okay, now it's just right.
INTREPID Oh, I know what I have to do, Al. Stand-
ing here not doing it. Okay, maybe I need to move the side on
in.
INTREPID It's moving right along. Catching up.
CAPCOM Yankee Clipper, Houston. Go to wide
deadband.
INTREPID Houston, you can log me for my first
(garbled)
INTREPID Hey, Houston.
CAPCOM Pete, go ahead.
INTREPID It's real interesting. You can put out
this ALSEP right. There's one thing that's pretty obvious as
we're setting out the components of the ALSEP here is I just
hope that these thermal coatings don't have to stay as white
as they are right now, because there is just no way. With
all this dust there is just no possibility that they won't get
a little bit dirty.
INTREPID Little bit dirty isn't the word for it.
INTREPID I know it, it's going to be a real problem
I guess if thermally they've got to maintain that coating,
because there's just no way you can do it. Everything that
touches the ground picks it up. These suits are about half
dirty (garbled). It's a little dirty even on top of the fuel
element there.
INTREPID Okay. Wait just a minute now before you -
CAPCOM Al, we copy your comments.
INTREPID There. I guess we just have to make
allowances for things like that when we build them.
INTREPID They sure are going to get dirty.
INTREPID Okay, I'm unlocking the cast dome right
now. Unlocks perfectly, shaking it out trying to get it off
and ready to go.
INTREPID It came off beautifully.
INTREPID Put 2 in the (garbled) some aside

INTREPID Very nice.
INTREPID And I'll get out the cast removal
tools.
INTREPID You can stand over there Pete, it would be better.
INTREPID I've got to go back to min cooling. I'm
about to freeze to death.
INTREPID (garbled)
INTREPID Okay. Go ahead.
INTREPID Yes, oh, (garbled)
INTREPID There you go. (garbled)
INTREPID Okay, I've got the rocks over.
INTREPID It's beginning to chip.
INTREPID Got it screwed all the way to the end.
INTREPID That could make a guy mad, you know it?
INTREPID Yes.
INTREPID Let me undo it a minute and try it a
different way.
INTREPID Yes.
INTREPID It's going to get you mad.

END OF TAPE

INTREPID Let me undo it a minute; and try it a different way. It really gets you mad. Houston, Al put the tool on - screwed it all the way down and fuel element would not come out of the kit. He's taking the tool off and working it again.

CAPCOM Roger - we copy.

INTREPID Well? Come over and look.

INTREPID I'll tell you what worries me Pete.

If I pull on it too hard, its a very delicate lock mechanism; not push the pins in quite so far, and wiggle it a little. Just get the feeling that it's hot and swelled in there or something. Doesn't want to come out; (garbled). Come out of there, Rascal.

INTREPID (garbled) or something?

INTREPID Say, Houston.

CAPCOM Go ahead.

INTREPID Okay, we've really got a problem I guess. I tried using different pins, you know it's got a 3 pin removal - dual - so I tried using different pins and different holes, and that doesn't seem to have any effect; it operates - you know - everything operates just exactly like it does in the training mock up in upper GE - the only problem is it just won't come out of the can; I am suspicious that it just pulling in there or something and friction is holding it in, but it is such a delicate tool, I really hate to pull on it too hard; I think what we can do is -

INTREPID Hey, I'll be right -

INTREPID Where's that hammer -

INTREPID I'm gonna bang on the side of it -

INTREPID No - I got a better idea. Where's the hammer?

INTREPID That's what I said.

INTREPID No - No. I want to try and put the back end under that lift there; pry her out. You go get the hammer. Be right back; where did you put it?

INTREPID What? Hammer is on the MESA.

INTREPID Okay. Let me get the tool off so it can warm up.

INTREPID Okay.

PAO Al Bean having difficulty removing the radioisotope fuel element from its stowage cask.

CAPCOM Al, when you're working on that, try to make sure you've got the pins all the way in, tighten up on it, then you can try pushing down on it a little, before you pull it out.

INTREPID Okay. Don't touch these needles; if these break off, that's all she wrote.

INTREPID Yeah, I understand.

INTREPID And don't pound on anything that'll break.

INTREPID No - no, I'm not going to.

INTREPID We'll try it again.
 INTREPID Okay - try it this way.
 INTREPID Pried in there just like you said; (garble)
 It just doesn't do the job.
 INTREPID Oh man, look at the dust fly.
 INTREPID (garble) Just a minute. Get those pins
 in here again.
 INTREPID I can't get those pins all the way in.
 They are not in now because I'm lining them up. Now they are
 all the way in.
 INTREPID All the way?
 INTREPID Not quite. I thought it was down there,
 INTREPID It's my recommendation we pound on the gasket;
 you know. Hey, that's doing it; give it a few more pounds.
 INTREPID Gotta be harder than that.
 INTREPID It's going -
 INTREPID It's coming out - that's -
 INTREPID It's coming out. Pound harder; keep
 going. Come on - Conrad. Keep going baby. That's a universal
 tool.
 INTREPID You better believe it; there; we got it.
 Ha Ha Ha. That's beautiful.
 INTREPID That's too much.
 CAPCOM Well done troops.
 INTREPID Man, this'll put the hatch -
 INTREPID We got it - it fits in the RTG real well.
 (garble) holding in on the side.
 CAPCOM Yankee Clipper; Houston. 1 minute to LOS.
 INTREPID - moon without a hammer. That's it Pete.
 Ha Ha Ha.
 INTREPID That's dandy.
 INTREPID Ha Ha Ha. Make our move -
 INTREPID I'm ready -
 INTREPID That's fast going - okay, Houston. The
 fuel element is in the RTG. I can feel it radiate heat already.
 Put your hand over here -
 CAPCOM Copied that Al.
 INTREPID Wait a minute - no. No, wait a minute Al;
 have you got it back (garble).
 INTREPID Okay.
 INTREPID No, you are all right.
 INTREPID All right?
 INTREPID Yeah.
 INTREPID This thermal coating doesn't mean a thing
 here.
 INTREPID (garble) is really getting covered with
 dirt. Gosh; I hope they made allowances for it.
 INTREPID They do. Okay - 9 pounds.
 INTREPID It didn't look like it.

INTREPID I'll let you know in just a second. It's the
right weight.
INTREPID That's it.
INTREPID I didn't feel it.
INTREPID (garble) That's amazing.
INTREPID 1 400 degrees.
INTREPID Almost as hot as the sun.
INTREPID (garble) (laughter)
INTREPID Hey, do me a favor.
INTREPID No, go lower. There you go; you got
it.
INTREPID Okay.
INTREPID Okay, let me go - scouting over the
area.
INTREPID Got everything you need? All right,
there's no TV, so I guess the slide - and the picker-uppers
for the rock.
INTREPID Okay; let's go right off to our little
mound over there; how does that grab you?
INTREPID Okay. There's something wrong.
INTREPID What's the matter?
INTREPID Thing's jammed. The thing doesn't - (garble)
CAPCOM Pete - we copied. You've got the
UHT tongs and subpellant.
INTREPID We're making our move Houston.
INTREPID Ah, I can tell this is going to be
a work -- mode; (garble).
INTREPID How long did you say our shadow was;
the LM shadow; 150 feet?
CAPCOM Stand by Pete.
INTREPID No, that isn't any 150 feet.
INTREPID Take your time Al; I just going out -
INTREPID Whats the hurry - you got it made.
INTREPID No, I'm just going out to scout the area
that's all.
INTREPID Okay, I'm going to set it down right.
INTREPID Okay; go to intermitent cooling.
INTREPID Okay.
INTREPID They ought to build equipment for
lunar operations some other color besides white.
INTREPID (garble) (laughter)
INTREPID (laughter)
INTREPID I'm going to go right up to the
head crater I guess.
INTREPID Al, if you're going to do anything - - -
move it; give me some more.
INTREPID Okay, any direction you want me to go?

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 1164300 CST 705 317/4

INTREPID Well, it looks to me like either the direction of you're headed is good, or the one a little bit more to the right; got it. You are going to have to go far enough so we don't end up in one of the craters when we (garble) deploy.

INTREPID Okay.

INTREPID Let's see, I want to go 10 degrees off our take off angle; I think I'm headed out about that way now.

INTREPID Okay.

INTREPID You just stay back there and take your time. (garble) the area.

INTREPID You're getting pretty far out.

INTREPID Huh?

INTREPID Getting pretty far out -

CAPCOM Pete and Al - your LM shadow should be about 110 feet

INTREPID Okay. I'm looking for -

INTREPID I can't - I'm dying to find out what this mound is over here anyway, Al.

INTREPID Got a very peculiar mound sticking up out of the ground here; I want to go look at it, I think I'll take a picture of it.

INTREPID My -

END OF TAPE

INTREPID This is a shot of the ground, Houston.
I was going to look at it, just the same, I think I'll take
a picture of it. Now my -

CAPCOM Roger, Pete. Could you give us your
position and distance with respect to the LM.

CONRAD Roger. Wait 1.

BEAN Go ahead, Pete. Do what you're doing.

CONRAD It's about - I'd say it's about 300 feet
at 12 o'clock in the bottom of a shallow crater that you're
bound to see on your map. It's sort of a doublet.

CAPCOM Okay.

CONRAD You see the right-hand edge of the head
crater.

CAPCOM Roger.

CONRAD Hey, Al. Here's a neat spot to put it
out here.

BEAN Is it flat for a good, Pete?

CONRAD Oh, we'd better believe it.

BEAN Okay, we'll put that -

CONRAD It's a good long ways away too, it must
be at least, what, 500 feet from the LM?

BEAN I don't know.

CONRAD It sure is.

BEAN It's a little, most peculiar. I got to
photograph this thing. I can't imagine what it is. The mound
is sticking up, and I can't imagine how it got there or what
would make it - boy, you can cover the ground on this light-
weight 1/6th G.

CONRAD I got to get them a stereo of this thing.
It's really fantastic. How's our timeline going, Houston?

CAPCOM Pete, at 1 plus 48 into the EVA, you're
looking good. Looks as though you're right on there if you've
just about completed your traverse.

CONRAD We have, Houston. Now, look, Al. It's
over here.

BEAN We're way out from the LM.

CONRAD Over here, Al.

BEAN Okay.

CONRAD See around the edge of this great big
flat area. That's a good - hey, there's another one of those
mounds over there.

BEAN Where? Hey, you're right. What do you
suppose they are?

BEAN I don't know. Houston, what they are,
they're just sort of mounds. Look like, don't take this the
wrong way. It looks like a small volcano only it's just
about 4 feet high, and it's about at the top, it's about
5 feet across, and it gets sloped from the top on down to

BEAN the level with the terrain, and that diameter, that circle is where it finally becomes level with the terrain it's about 15 or 20 feet. It looks sort of like a small volcano.

CONRAD There's a couple of them out here. They look like they've normally made out a bed or something.

CAPCOM Al, roger. We copy. Is there any hole or central vent?

BEAN I don't know. I got to go over - we'll go over after we get the ALSEP out. There's a couple of them here. There was a - this is a - we couldn't ask for a better spot to put this down.

CONRAD No, this is nice.

CONRAD Hey, lot more rocks up here.

BEAN Listen, we could play geologist for 2 days and never get any further than we are right now. Seeing all different kinds of things.

CONRAD Here's a different one.

BEAN Yeah. It's really neat. Better than any geologist in Houston. (Laughter)

CONRAD Let's get a quick pan of the area here right in the ALSEP limit. There you go.

BEAN Okay, man alive. (garbled)

CONRAD No, I'm not the type. By the handles you know when you carry this thing around in 1 G, the ALSEP gets to hang down, but you carry it around up here at 1/6 G, particularly the RTG tends to rotate, the whole pallet. So in a few minutes, you've got one up kind of half way up in the air and the other one's down by your left leg. Being afraid that the handle's going to come undone. Your handle doesn't lock. Okay. I have to almost - that's slick. You know these 3 little decals we got on here?

BEAN Uh huh.

CONRAD You can't hardly read them in the sunlight. They don't have enough contrast to them. They're so bright. Okay, let's move them. Okay.

BEAN I'm going to make sure now that we're not going to run out into some hole. That's pretty good. Pete, I'm going to move just a little bit further to the east, correction to the north, so that I won't end up over in that hole to the side. Okay?

CONRAD Okay. Yeah, I think it would be a real good spot. Okay, I'm (garbled).

BEAN Okay, I think this is the spot, Pete, right here. We've got to make sure now that we're going to have a good place for everything.

BEAN Yeah, we will. Magnetometer can sit over there and seismometer on just a good flat place, although the trouble with the seismometer, we don't have any good solid bedrock or anything to set it on. All we've got is this - this dirt.

BEAN I don't see any area around that has any rock.

CAPCOM Roger, Al.

BEAN We're just going to have to take what we can get on this seismometer. There must be some thermal expansion or something. I'm having a heck of a time getting this UHT in this side. It just flat won't go in there.

CONRAD Well, just pick it up with your hand. I always handled it back with my hand.

BEAN I can't pick - bend down that far.

CONRAD Okay.

CAPCOM UHT is the universal handling tool. The side is the super thermal ion detector experiment.

CONRAD Where'd you go, Al?

BEAN Right over here, babe.

CONRAD Oh, you miles away.

BEAN Yeah, I am. I moved over here.

CONRAD Oh, son of a gun.

BEAN I had to do it, Pete, so that I'd have a good place for the side.

CONRAD Okay, there's a good spot. Looks good.

CAPCOM Al, when you deploy that PSE stool, it would help if you tamp that ground down as well as you could before putting the stool down.

BEAN I'm going to try to do that. This ground is - is not - you know, it doesn't get hard as you move down a couple of inches. You just tap it, and that's what I'm plan to do, but I don't know. We'll just have to see what happens. I'm worried about it getting a little short myself.

CAPCOM Roger, Al.

CONRAD Boy, I'll tell you.

BEAN Man, are you dirty. Boy, we should have cleaned that out a bit. Look at the ALSEP.

CONRAD I know.

BEAN Ridiculous. (Laughter)

CONRAD I remember how they took care of this white paint. You had to have gloves. (Laughter) They must begin to - uh. They got a kind of a problem here.

BEAN I have to do this myself. I have to do this backwards, but this is going to work right. Do me a favor, Pete. Look at each (garbled).

CONRAD I'll be with you in a minute.

BEAN Okay. You better relieve me in this side right here while I rest, because it looks like it might -

CONRAD Give me that thing, let me hold it. That's a boy, okay. That a boy, now, the instrument's first (garbled). Yeah, but let me get it plugged in.

BEAN They sure do flay around under this

BEAN 1/6 g don't they?

CONRAD It's moving around a bunch.

BEAN Wait, I got you right here, watch it, watch it.

CONRAD Wonder if the thing's straight.

BEAN Should be.

CONRAD Figuring on that other one. Obviously, it's on the side I can't see.

INTREPID should be traded on that other one. Obviously
it's on the side I can't see. Yep, two to blue.

INTREPID You know that noise, this whistling, is coming
from you, Pete. Because everytime you move around it
whistles, when you stop it quits.

INTREPID Is that right?

INTREPID Yep.

INTREPID Here it is.

INTREPID Is the light good?

INTREPID Yes sir.

INTREPID Take your angle in with it.

INTREPID Here's this.

INTREPID Drop that baby.

INTREPID Dick, you got it?

INTREPID Man the cable line there.

INTREPID My right foot, I came out.

INTREPID That's what I wanted.

INTREPID Okay.

INTREPID That's what I wanted.

INTREPID All right, those lights came on nice.

INTREPID The next thing I got to do is head this way
with it, right?

INTREPID No, before you do that, come here a second
would you please.

INTREPID What do you - yeah, but let me set it down -
Uh Oh, the top popped open, supposed to do that?

INTREPID No. Not supposed to do that. You can close
it, though before it gets any dirt in it. Can just reach up there
and close it.

INTREPID Okay, you better - you better get up before
(Garble) while I'm holding it.

INTREPID Okay.

INTREPID Before we get any dirt on it. That's a good
way to deadhand it, never saw it do it before.

INTREPID (Garble) We could still salvage that, though.

INTREPID I believe that the little - the little -

INTREPID I see it, I see it, attaboy.

INTREPID Now turn it - turn it over with your other
hand, Pete (garble).

INTREPID I'm waiting.

INTREPID (garble) go with it?

INTREPID (Garble) Let me get this. In outlet 3 DS stay.

INTREPID That's right.

INTREPID (Garble)

INTREPID Yeah, yeah, this won't hurt a thing.

INTREPID Yeah.

INTREPID (Garble)

INTREPID That's it: you got it but just don't touch
that. It'll be okay.

INTREPID Okay.
INTREPID Didn't hurt a thing.
INTREPID Let me just put this down here.
INTREPID Okay.
CAPCOM Pete, before you set the Central Station down
for the final time if you'd also tap that ground down it would
help in keeping the dirt off of the thermally sensitive areas.
INTREPID (Garble).
INTREPID I did it, I did it. I sat it down and it
didn't fall over. I can't believe it. Here I come. What do you
need, Al?
INTREPID Use your tongs to hold this up a minute.
It's real hot and I don't want to touch it.
INTREPID What's this?
INTREPID Where are my tongs?
INTREPID There you got them. Now if you'll just hold
it steady then I can do the rest.
INTREPID There, now that's good.
INTREPID Thank you, Pete, got it.
INTREPID Okay, I'll go get the rest of the stuff over
here where we're at.
INTREPID Okay.
INTREPID No, we can't get these apart.
INTREPID Okay, take your time.
INTREPID Things coming out real well.
INTREPID Play the name of the game, when you get the
ALSEP here, whoom, it's up to one crater and over another.
(Laughter).
INTREPID Oh, man.
INTREPID That looks (garble), it does but I'll tell you
the way to do it, Pete, bend that rock from side to side as
you run like that. There you go (laughter)
INTREPID You really move better that way.
INTREPID Here I come, ready or not.
INTREPID I'm not kidding, we are really getting dirty
out here. There's no way to handle all this equipment with
all the dust on it. Every time you move something the dust
flies and in this low gravity it really takes off, goes
way up in the air and it comes in and lands on you. How far do you
estimate we're from the Lm?
INTREPID 600 feet -
INTREPID At least.
INTREPID I think you're right. 6, 7 hundred feet - way
to do it.
INTREPID Here I come. (Garble)
INTREPID Coming in to the antenna band.

INTREPID Okay - Okay let me plug this thing in -
INTREPID It took you damn long enough to get it off.
INTREPID I'll get it for you, if you can't.
INTREPID Okay, wait a minute. Let me move that dust
cover for you.
INTREPID (Garble) (Garble)
INTREPID Here he is, look at this (garble).
INTREPID Strikes me pretty good.
INTREPID Pile up (garble) the dirt around this central
space here.
INTREPID Okay.
INTREPID Could have designed things with legs on them
or something so you could put them down and they stayed off
the soil. If we had that suit we could bend over in, we'd
have the job done by now.
INTREPID Hey, can you push down on this side of that?
INTREPID I think it's sweated.
INTREPID Bend over and wait a minute. Ready, get set,
push.
INTREPID That on, or not?
INTREPID I don't think so.
INTREPID I don't think so.
INTREPID No, let me look at it a second. Here we are.
INTREPID Which way you want this.
INTREPID Over there, on there.
INTREPID I had to really push that other one on there.
INTREPID Look at all that dust.
INTREPID Okay now. (Garble).
INTREPID I got it. I did it now. I did it now.
And we won't touch the shortening bug. Okay, we connected
the RTG to Central Station, Houston. And we're ready to go
to work deploying experiments.
INTREPID Have you got the antenna man?
CAPCOM All right.
PAO The RTG is the radioisotope thermal generator
which will power the experiments in ALSEP. These experiments
being deployed 6 to 700 feet west and a little north of
the LM.
INTREPID It opened, Houston, and we closed it again and
we got no dirt on it, fortunately.
CAPCOM Roger, Pete. Well done.
INTREPID Okay, let me tap the dirt down underneath
the Central Station. (Garble) whoops. (Laughter). It's me.
INTREPID (Garble) what happened?
INTREPID No, I started to walk away with the Central
Station to test for the UHT via the little ditty, okay?

INTREPID The RTG is down and cooking.
INTREPID Okay, I'm tapping the dirt here.
INTREPID Okay.
INTREPID Have I got it tapped pretty good, look over
where I'm tapping. How am I doing?
INTREPID Looks good, need a little bit more this way I
think.
INTREPID On talking about tapping, Pete, it looks like
every time you tap it your foot comes up - so it -
INTREPID Yeah, I picked it up -
INTREPID It redusts the area.
INTREPID Yeah. Okay. Here we go, Al. Now take your
UHT -
INTREPID Move that -
INTREPID that keeps the side cable clear.
INTREPID That's good. All right.
INTREPID (Garble).
INTREPID (Garble).
INTREPID Get it raised?
INTREPID Yeah, (garble) -
END OF TAPE

INTREPID (garbled) side cable cleared. That's good.

INTREPID (garbled) Here she comes, there she goes. Get it right down (garbled) There you go. How's that?

INTREPID Pretty good.

INTREPID Okay, ready to go to work.

INTREPID Go, have at it.

INTREPID Okay, well, let's see, I've got to get the solar wind, huh?

INTREPID (garbled)

INTREPID Houston, how are we doing on the timeline?

INTREPID Do you read me in?

INTREPID Sure do.

INTREPID Houston, how are we doing on the timeline?

INTREPID They may be (garbled)

CAPCOM Al, did you have a reading on the shorting amps?

INTREPID Wait a minutes, I'll get it. Hold the phone. Do you read me, Houston?

CAPCOM Sure do, go ahead.

INTREPID I was asking you how we are doing on the timeline?

INTREPID I can't see the needle anywhere, can you, Al?

INTREPID (garbled)

CAPCOM Pete and Al, at 2 hours 7 minutes into the EVA you're about 5 minutes behind.

INTREPID Okay. Pull, over a little bit.

INTREPID Damn it.

INTREPID Going back to min cooling. What do you need?

INTREPID (garbled) to look.

INTREPID Okay.

INTREPID I don't see a needle in there.

INTREPID I don't either. That's what's bothering me. It reads zero and I don't see a needle.

INTREPID I don't even see a needle in there, Houston.

INTREPID Okay, let's quit screwing with it.

INTREPID Let's get on the timeline here.

INTREPID (garbled)

INTREPID Houston, did you get our last comment?

CAPCOM Negative, Pete. Go ahead.

INTREPID We can't see a needle in the (garbled) amp anywhere. It's not at zero, it's not in sight.

CAPCOM Roger, we copy. Go ahead.

INTREPID We're not done for the seismometer, Houston. And I set it up in a little crater so that the stool, the hole in the center of the stool, has more clearance between it and the ground. Hopefully this will keep the sides from getting in the ground (garbled).

CAPCOM Roger, Al, that's good. Go ahead.
INTREPID (garbled) What's the odds - looks like
it might work. I jammed it also in the small crater there.
INTREPID Okay I've got the solar wind deploy here.
INTREPID Okay.
INTREPID Boy, you really have to be careful of
the cables, don't you?
INTREPID Okay, looks good. Looks good.
INTREPID Okay, after the solar wind I did an
EMU check and I'm down to mid-cooling anyhow and it says (garbled)
INTREPID (garbled)
INTREPID Wait a minute, let me by.
INTREPID Wait a minute.
INTREPID I tell you, we have to be careful.
INTREPID Don't move sideways, just backwards.
You just don't know what's there. Always got to move forward.
INTREPID Yes.
CAPCOM pete, we copy an EMU check.
INTREPID Good.
INTREPID We copy it.
INTREPID Shove it.
INTREPID Just put your thing in the holder and move it over
this way a little bit.
INTREPID I'm not sure I can do that but I'll
give it a try.
INTREPID Watch it, there you go. How's that
for one footed la-dee-da?
INTREPID That's good.
INTREPID If you make me knock my solar window
I'm going to be mad at you.
INTREPID Okay (garbled)
INTREPID Be sure you open that.
INTREPID Hey, don't touch that. I've got
one bolt pulled off of it.
INTREPID (garbled)
INTREPID Huh?
INTREPID Going to help you do it that way?
INTREPID No, it's got one bolt pulled out of that thing.
INTREPID Okay, go ahead.
INTREPID Quit doing it, it's making a mess.
You'd be better off - let me - listen, leave it set. Let
me hold this and you put that stool back here closer.
INTREPID Oakie doak.
INTREPID Am I over on the cable?
INTREPID You're okay.
INTREPID Huh?
INTREPID No, you're okay.
INTREPID Got it?
INTREPID Yes.
INTREPID (garbled)

INTREPID Yes. Take the clip off.
INTREPID Okay.
INTREPID All right, now, you move your stool
back.
INTREPID Good. Better check.
INTREPID Okay, that's your EMU break.
INTREPID I am.
INTREPID I'm trying to stay away. That's a nice
job on that solar wind.
INTREPID Thank you.
INTREPID You've got to be careful you don't kick
dirt on them once we get them fastened down. I guess the
way you can do it is have a sort of package down on the dirt.
What are you doing anyhow?
INTREPID I had to get this darn thing.
INTREPID Here you go, move it up right here
where my footprints are.
INTREPID Okay.
INTREPID That a boy. That a boy. Now
Doing good. Now - now - now tap it right around in there. That
a boy. And take off the central (garbled) Now let's see what
happens to (garbled).
INTREPID That's good.
INTREPID That looks like it would be okay,
doesn't it?
INTREPID Yes.
INTREPID Okay, let me do a couple of things.
(garbled) Take it back and (garbled)
INTREPID Hold it over a little bit more and level
it off.
INTREPID (Garbled)
INTREPID Okay, that got kind of a deeper hole
than the center.
INTREPID Yes, it's in good shape.
INTREPID It doesn't have to level?
INTREPID No, cause the other one levels from the
stool. Push it down a little bit.
INTREPID Okay, that's a good idea.
INTREPID Did you get it?
INTREPID Look good, looking good.
INTREPID Give me the tongs and I'll put them
away.
INTREPID Okay.
INTREPID Get with it and I'll start opening
the lid now.
INTREPID That's going to do okay, Pete.
INTREPID Thank you.
INTREPID Yes.
INTREPID (garbled)

END OF TAPE

INTREPID Now with the 3.7 PSI. I whistle while I work.
(whistle).

CONRAD Hey that seismometer is right in position now.
I just hope that nothing happens to it. That's real good Al.

BEAN Yes it does. It looks like it's going to clear.

BEAN Houston, looks like digging that little hole
might work. Setting up there nice now and looks like it might not
get down in the hole. Maybe we did it. Let's just see.

CAPCOM Roger, Al. We concur, it sounds like a good plan.

INTREPID Look at that.

INTREPID What?

INTREPID Put a little dirt on it, I guess. When I put
out the skirt of this foil, it doesn't want to lie down.

INTREPID I probably can just put it on.

INTREPID It looks like it has sort of a static charge
on it. It's resisting the lunar surface. I'm sure that isn't it.

INTREPID Be back in 1 second. Watch out. Don't come
across.

INTREPID I know.

INTREPID That's what I want you to do is come take it.
The cable isn't even unreeled. See it is pushing. Take it out
there and set it. Atta boy. Its right behind there, you
might want to trip it, - uh, trip it off that thing. What?

INTREPID Trip it off what?

INTREPID It's on that post.

INTREPID Oh, all right.

INTREPID That picture is going to come in.

INTREPID That shadow is going to be just right. Okay.
Ah fiddle diddle, come on. Hey, everything is going great, but
that whistle is driving me nuts. Bothering you?

INTREPID A little bit.

INTREPID Doggone, I can't help but get dirt on this
darn thing, no matter how careful I am.

BEAN I don't think there is a way, Pete. I don't
think there is a way. You put it out on the PAD and then your last
step, right to your side over there, it deploys off your thermal
wrapping, your dirt protector, and you end up with a nice clean
experiment up there.

INTREPID How are we doing on the timeline, Houston?

CAPCOM Stand by, Pete.

INTREPID (laughter) Boy, its just the way things pop
off down here.

INTREPID Won't be long and I'll get to my favorite task,
cleaning the antenna.

CAPCOM Pete, we show you are about 8 to 10 minutes behind,
but it's no sweat. You've got lots of oxygen and feedwater, and
we'll give you an update on the time remaining when you finish de-
ploying the ALSEP.

BEAN Roger. Good. It looks like it's going real
good, Houston. The seismometer, I'm having a little trouble making
the skirt lay down, but other than that it looks good. It doesn't
want to just lay flat like it does on earth. It wants - gee - it sort
of wants to slip up again. I guess it's cause it's got this memory
in it from being folded so long.

CAPCOM Roger, Al. You can make a 2 man task out of that, and put a little dirt around the outside edge to hold it down if you like. You won't have any trouble getting a little dirt on it will you?

CONRAD I'm pushing it down. That'll do it.

BEAN Okay, Pete,

BEAN Let me level it up. I think it is pretty near level, it's lined up exactly.

CONRAD You said give it a couple of pushes. I get the feeling there are a couple of (garble) around.

BEAN It looks as level as can be to me. Looks good.

CAPCOM Roger, Al. You have the bubble centered.

CONRAD I'll tell you an interesting thing about this bubble, Houston, - uh, no it's okay. It's okay. If not - Al, I'm afraid something - these (garble). And not (garble) I don't understand why.

INTREPID Why, wasn't that (garble) or what?

INTREPID I don't know. I haven't the foggiest idea. I thought all of them did.

INTREPID It looks like you are well ahead of the time.

CONRAD Hey, Al, take your stick and put dirt up on it right there.

BEAN Huh?

CONRAD Take your stick and just put dirt - a little dirt on the edge, just on the edge there, not much.

CONRAD That's okay. I won't do that anymore.

INTREPID That's okay, that skirt will stay down okay, now.

INTREPID Okay, that's complete, let me take a couple of picture of it.

INTREPID Okay, Houston. The acid sismic is down, the alinement is exactly 90 degrees, and I'm going to take a couple pictures of it here. (garble) Here it is. Okay.

INTREPID Look and see if the lens on my camera look clean?

INTREPID Wait a minute. There you got it made.

CONRAD No, I don't either, Al. What's the matter? Want me to hold down this part while you get that in the (garble).

CONRAD Push that (garble) down there. Whoops, got it. Looks beautiful. Hey, it's alive, it sure wants to come up doesn't it? (laughter) beautiful. Houston, central station UP.

CAPCOM Roger. Copy. Central station UP, and 90 degrees on the PSE Gnomon.

CONRAD Hey, Al.

BEAN Yes sir.

CONRAD Never mind I'll get you in a minute. Don't ever move backwards. Hey we're going to have to do a lot of - J'do fall over?

BEAN No, but I just - you didn't come too close, it's just that I think it's just something to follow as a rule, but don't kick dirt on this - uh. (garble).

INTREPID We've got it on the central station, here, the level.

INTREPID Not too bad.

END OF TAPE

INTREPID Not too bad.
INTREPID Got a good shot on it Pete?
CONRAD Okay.
INTREPID Okay; cap the magnetometer.
INTREPID Central station; way up to (garble)
INTREPID (garble) lose their mind; okay?
INTREPID I'm down in a little crater now

Houston.

INTREPID Sure enough; right in the bottom of the crater, there is a lot softer dust than up on the rim. Not much; but it's noticeable. I don't think the sides are slippery at all. I don't think it's going to bother us going over to get our Surveyor.

CAPCOM Roger Al. We copy. Are you on your way out with the LSM?

INTREPID That's right. Got it right in my hand; I'm out at the end of the line, and deploying the legs right now.

CAPCOM Roger.

INTREPID One antenna mast displaced Houston.

INTREPID Going back for the - my favorite thing.

CAPCOM Roger Pete; copy antenna mast in place and good luck.

INTREPID Look at that Pete.

CONRAD What?

INTREPID all these styro foam packing blocks that come on - that are put on there to protect it during shipment, or launch - when you take them off and throw them, they really sail. The things stay up for 10 seconds maybe.

PAO The LSM is the lunar surface magnetometer which will measure the moon's magnetic field.

INTREPID Pete?

CONRAD What?

BEAN Watch this.

BEAN (laughter)

CONRAD (laughter)

BEAN Hey I just threw something; it hasn't hit the ground yet; it must have gone up 300 feet. Boing $\frac{1}{2}$

CONRAD (laughter) Stop playing and get to work. (laughter)

BEAN Maybe they'll extend it to 4 and a half hours; I feel like I could stay out here all day.

CONRAD Right there.

INTREPID It's going to be a good place for the magnetometer.

CAPCOM Pete; we've been thinking on that camera and once you get back we'll have a test for you to run on it - it looks as though part of it has come back and we are going to try and see what we can salvage.

CONRAD Okay.

INTREPID What do you think happened to it Houston?
 CAPCOM Al, we are not sure on that; why don't
 you wait till you get back to the LM and we'll work it out
 a bit and see if we can determine it.

INTREPID All right.
 CONRAD Hey, Al?
 BEAN Yes sir?
 CONRAD See that thing. Gee, that's weird.
 CONRAD (laughter)
 BEAN (laughter)
 INTREPID The arm - I knew they just drop out
 of position; here they don't even want to stay.

INTREPID That thing hit the ground and is still
 bouncing. Slick; that's really slick.

YANKEE CLIPPER (garble)
 CAPCOM Hello, Yankee Clipper; Houston.
 YANKEE CLIPPER (garble)
 BEAN Pete, there's no way to keep these
 things clean; I'm really worried about this white coating.

CONRAD Lucky for me that the antenna had it
 almost level. You can see that; isn't docked is it?
 INTREPID See what I can do with it -
 INTREPID Here it is. Here it is. Right there.
 Right in the center.

INTREPID (garble)
 CAPCOM Yankee Clipper; Houston.
 YANKEE CLIPPER Hello Houston; Clipper here.
 CAPCOM Dick's EVA is going pretty well; they
 are 2 and a half hours into it; and they have got the ALSEP
 a good way deployed; apparently both of them look as though
 they just crawled out of a coal bin. Other than that, things
 pretty much nominal.

YANKEE CLIPPER Very good; thank you.
 BEAN Okay, Houston, the magnetometer is
 deployed; it's level and it's pointing exactly east. And
 the little black dot is right in the middle.

CAPCOM Roger Al; copy.
 BEAN The main concern here is there's just
 a lot of dust on top of the box of the electronics there.
 Just hope it doesn't bother it too much.

CAPCOM Roger Al.
 CAPCOM Yankee Clipper; we have a map update
 for rev 19.
 YANKEE CLIPPER Okay.
 CAPCOM Rev 19; LOS 118 48 40. 119 13 30 119

CAPCOM 34 33.

INTREPID Okay, Houston; we got good pictures of this. Thanks a million.

INTREPID What are you mumbling about over there?

INTREPID I just don't - I don't like all that dirt on it; don't know what we can do though.

INTREPID No way to work around them; the radiator has got a little dirt on it; there is no way to dust it off and there is no way - all you can do is tap it a little bit; and hope, some of it falls off, and then that's about it. You don't want to tap it too hard. That's about the best you can do.

INTREPID Okay.

BEAN Okay - I'm deploying this out now
Pete.

CONRAD Okay.

BEAN It's my last item.

CONRAD It's not my last one.

BEAN Okay.

INTREPID That antenna looks like its pointed
at earth?

INTREPID It looks close.

INTREPID (garble)

END OF TAPE

BEAN That's all right.
 CONRAD You can view the sun right now. Got it.
 BEAN Okay. Okay. May better tug on the
 station here as I come out, Pete.
 CONRAD How'd that happen?
 BEAN Now it's pretty level by the way you're
 stationed to it.
 CONRAD Yeah. We're nearing the end on that.
 BEAN I'm done. I'm done now.
 CONRAD It makes a (garbled) in front of this
 one.
 BEAN Does it? You in the end, you're in the
 end.
 CONRAD Okay. Let me set it down, and we'll
 cut it right here, old buddy.
 BEAN Okay. Okay, now what do I want to do?
 CONRAD (garbled) like to have this one.
 BEAN Pick up the tong.
 CONRAD What?
 BEAN Pick up the tongs. Were they with that
 box or do I have them?
 CONRAD If you haven't got them on you. I do.
 I can't see. No, they weren't with that box.
 BEAN We used them for something by the central
 station.
 CONRAD Oh yeah, I got them on me. Okay. Okay,
 Houston. The antenna is up. It's aligned on 1644 and 525.
 CAPCOM We copy that, Pete. You got the nominal
 alignment.
 CONRAD That came out.
 BEAN STIDE screen came out pretty nice.
 Hey?
 CONRAD After that looks good.
 BEAN Boy, it's dirty. This is dirty.
 CONRAD Bet you that's the one that stayed there.
 BEAN Okay. I can't believe this.
 CONRAD You gotta be kidding. Boy, anytime
 you put anything spring loaded on the moon you're in trouble.
 BEAN Spring - you've got sort of, you know,
 a spring shirt. (Laughter).
 CONRAD Doesn't want to lie down much up here
 in this gravity. Okay, Houston, how long we been out?
 CAPCOM Pete, you've been out 2 plus 40, and the
 pacing one right now is L. You're running around 20 minutes
 behind, and when you can we'd like an ENU check and if you'd
 give us your O2 readings.
 CONRAD Okay, my O2 reading is 50 percent, and
 have you got anything for us? Haven't heard too much from
 you.

CAPCOM Negative on that. You're perking along real well. We're following your progress. It looks as though you're getting the job done.

CONRAD Okay. Look, how you doing, Al?

BEAN I'm doing great. That thing just doesn't want to -

CONRAD Houston, let me ask you a question. Can I push in the (garbled) thing?

CAPCOM That's affirmative, Pete. We understand you're not able to get a reading, so go ahead and close it, and we'll stand by for a zero reading.

CONRAD Okay, it may be full scale.

BEAN Hey, you'd better tell them and be sure I haven't put the flag down.

CONRAD It doesn't make any difference does it?

BEAN I don't know.

CONRAD It's all connected. It's all connected. Does it make any difference, Houston?

CAPCOM Stand by.

CONRAD You're a regular litter bug, you know that?

BEAN I know it.

CAPCOM Pete, we'd like you to go ahead and get the full deployment down first before you depress the shorting amps.

CONRAD Okay.

BEAN Boy, you're dirty all over your knees.

CONRAD Can I give you any help?

BEAN Sure could.

CONRAD Alright, here I come.

CAPCOM And Pete, now a comment on picture taking. If you would try to document some of the dirt which has gotten all over the equipment. If you would try to get close ups which will show the dirt we might have on thermally sensitive areas. And, also, when you get done, if you would take one or two extra pictures showing the ALSEP with the mounds that you described previously in the background. That will give us a good geometric reference.

CONRAD Okay. I -

BEAN Hold on, Pete. I need a pan out here at the - okay, just a second. Now, let me hold this end and you stretch that end out.

CONRAD Okay, I got it.

BEAN Now, turn around and get the - kind of get the coil down. Which way is this thing head?

CONRAD It's got to head away from -

BEAN - central station - away from everything. Ought to be a point right over there.

CONRAD Okay, but I think if you kind of

CONRAD twirled it a couple of times it would end up uncoiling and twist into alinement.

BEAN That's right. We can try it that way again. Looks like it might be working. that's good. That's doing good. Okay, let me take and set this thing down, and it's supposed to point to the first this way. That'll be good.

CONRAD Get your ground wires wrapped around the leg.

BEAN Looks like it's going to be okay.

CAPCOM Yankee Clipper, Houston.

CLIPPER Go ahead.

CAPCOM Yankee Clipper, if you'll give POO and ACCEPT, we'll ship you up a state vector, a target load, and a REFSMAT.

CLIPPER You've got it.

CAPCOM Roger.

BEAN Okay, hold on, hold on. Don't tip over. Wait a minute, wait a minute. Okay, I got it steadied.

CONRAD Okay.

BEAN That's the right angle. Hold it there just a -

CONRAD Watch it, watch it, watch it.

BEAN Okay.

CONRAD Apparently, no, you're foot's hung in it. That a boy. That did it.

BEAN Okay. Let me get back on again. Okay.

CONRAD Now, where do you want it?

BEAN I want to put that lid back on there.

I think it would be best if we just left it off.

CONRAD I think it would be best if you left it alone.

BEAN Okay, now you hold it there while I -

CONRAD I got it anchored.

BEAN Cause this is going to want to turn it over.

CONRAD Yeah, I know.

CAPCOM Yankee Clipper, Houston. We're coming up with a load.

CONRAD Step on it.

BEAN Okay, that's what I think I can do.

CONRAD Those guys got to be kidding about that cable on it. I knew that thing was going to do that.

BEAN There, maybe that's better.

CONRAD Come on, this thing's making us run behind it.

BEAN I know it. I don't see any way -

couldn't we just - -

END OF TAPE

INTREPID Come on, this thing is making us run
behind us.

INTREPID I know it, but I don't see any way to
quickly - (laughter)

INTREPID All right, just a minute.

INTREPID (garbled)

INTREPID That's better.

INTREPID Pete, make it turn just a couple of
more times. I think if I hold it this way and use this tool
I can probably set it -

INTREPID (garbled) zero g, everything closed up?
That baby's going to nose dive into the dirt every time sure
as I'm standing here. That cable is cleverly designed to
make it do that.

INTREPID Let's put it like this. Down like that.

INTREPID Don't fall over.

INTREPID Okay.

INTREPID There's no way.

INTREPID Uh uh, just - that-a-boy.

INTREPID That things goes right into third
each time -

INTREPID I know, I know. It's going to do that.
It's very frustrating. Turn it around and point it the other
way. See if it will point out that way.

INTREPID All right, that might be good, too.

INTREPID Pete -

INTREPID (garbled) that ding-a-ling cable was
going to make us spend hours trying to do that.

INTREPID Doesn't that make you mad?

INTREPID Yes, you know, especially when you know
it's going to happen.

INTREPID Look, why can't I set it like this
and (garbled) come over and step on that thing.

INTREPID Now if that flag falls over then I'm
really going to be mad. I got that thing firmly planted.

INTREPID Just a minute. Wait, wait. Hold it,
hold onto me.

INTREPID (garbled)

INTREPID That fits. Now step on it.

INTREPID I can't. There's no way.

INTREPID I'd cover - I'd cover the string in
your hand. That-a-boy, now bend - (garbled)

INTREPID Wow, we made it. I hope. Let's push
it real hard in there.

INTREPID Okay.

INTREPID I think we've got it made.

INTREPID Up that way, another (garbled) The
thing just jumps right up.

INTREPID (Laughter)

INTREPID Pete, I'm just afraid of that one -
we've had it on this one.
INTREPID Yes, (garbled) that way.
INTREPID Here it is here. I don't think it makes
any difference if it lays on its side as long as it points
the aperture in the right place.
INTREPID Yes.
INTREPID Lets move it around here and just let
it lay on its side.
INTREPID Yes, I guess it does know the difference.
INTREPID If you're going to bring it around, just
try to - now, that will work.
CAPCOM Al, we concur with that. Go ahead.
INTREPID Looks like the only way - this
cable has just got too much spring for the weight of the
package. There's just no way.
INTREPID Okay, Pete, let it go. (garbled)
No way.
INTREPID That's a shame.
INTREPID (garbled)
INTREPID Let me get over here and get a big
picture of this.
CAPCOM Pete, you're 2 plus 48 into the EVA.
INTREPID Okay.
INTREPID Deliver this, Pete.
INTREPID It's leveling good. Leveling real good.
INTREPID That American flag sure looks pretty back
here next to the LM, doesn't it?
INTREPID Yes, I think that's going to do it for
the SIDE (garbled) that was a tough one.
INTREPID Back off, I got the picture.
INTREPID Have you already got it (garbled)?
INTREPID Can you see the bubble and everything
in it?
INTREPID No. Let me get - I'm just getting
one from a distance.
INTREPID (garbled)
CAPCOM Al, copy you have the SIDE deployed.
INTREPID Yes, everything's deployed. I'm going
to go get the shorting plug now, Houston.
CAPCOM Okay, standing by.
INTREPID (garbled)
INTREPID (Singing) Boy, do I like to run up
here. This is neat.
INTREPID (garbled)
INTREPID The first thing we've got to do is
run over to that volcano or whatever that little jagged thing
is and picture take.
INTREPID Okay, Houston, here comes the shorting
plug.

CAPCOM Yankee Clipper, Houston. The computer
is yours.
INTREPID Hey Al.
INTREPID Yes sir.
INTREPID I need your help over here in a minute.
INTREPID I'll be there.
INTREPID Houston, how about astro switch 1?
CAPCOM You're clear to rotate astro switch 1,
Pete.
INTREPID Okay.
INTREPID (garbled)
INTREPID Okay (garbled) We've got to realign
that antenna.
INTREPID Okay, Houston, astro switch 1 is rotated.
(garbled) amp switch is in. I'll be a happy man if you tell
me you're getting a signal.
CAPCOM Roger, Pete, stand by.
INTREPID Boy, it's all put up.
INTREPID It sure looks nice.
INTREPID How about messing with this one thing
right here?
INTREPID Okay, we'll do it, Pete.
INTREPID (garbled) just look at the numbers
(garbled)
INTREPID Will you do me a favor? Use your tongs
and pick up a couple of these boy bolts and put them on the
edge of that skirt. (garbled) that seismic. There are about
10 boy bolts just near it over there. What did you want me
to look at?
INTREPID Check that antenna and make sure it's
level.
INTREPID Okay.
INTREPID Okay, I'm (garbled)
INTREPID You stay there and I'll give you the
tongs and I'm going to run over and photograph that ding-a-ling
looking (garbled)
CAPCOM Pete and Al. Pete and Al, Houston.
Looks like you did the job. We're getting data back.
INTREPID Hey that's - you just don't know how
happy I am.
INTREPID Okay, tell me again the f numbers you
are supposed to -
INTREPID 16445.25. Here, turn around.
INTREPID Okay. I shouldn't have done that, Pete.
INTREPID Dirty all over here.
INTREPID Okay, I'm going over there to this mound.
INTREPID Okay.
INTREPID I'll be back in a flash. Bye bye.
INTREPID Okay, I'll tell you the numbers I read
and you tell me if they're right.

INTREPID Okay.
 INTREPID I read 52, no, correction: I read
 525.
 INTREPID That's right.
 INTREPID Okay. I also read 1642. I don't know
 what this thing is. It's really weird. 1642. Is that it?
 INTREPID 1644, Al.
 INTREPID Okay, same thing. Looks good, looks
 good.
 INTREPID I don't know what this is.
 INTREPID (garbled)
 INTREPID (garbled)
 YANKEE CLIPPER Houston, Clipper.
 CAPCOM Yankee Clipper, Houston. Go ahead.
 YANKEE CLIPPER Do you have a maneuver pad for me?
 CAPCOM That's affirmative. We'll be up with
 you in about 2 minutes.
 YANKEE CLIPPER (garbled)
 INTREPID I know what it is.
 INTREPID What is it?
 INTREPID Now I think that rock - I think it's
 a little secondary impact crater. (garbled) funny (garbled)
 That's a funny rock -
 CAPCOM Yankee Clipper, Houston. I have a
 maneuver pad when you're ready to copy.
 YANKEE CLIPPER Go ahead.
 INTREPID Hey, here's a rock they'll be glad to
 see in Houston.
 INTREPID Yes, here's an interesting one. It's
 rather soft -
 CAPCOM - purpose, lunar orbit plane change 1:
 SPS G&N 36733 minus 073 plus 051 119471254 minus 00115 plus
 03496 minus all balls. Roll, pitch, and yaw: All zeroes.
 00625 plus 00573 03497 018 03371 050026 187.

END OF TAPE

CAPCOM Dick, for foresight. DRACO BETA.
CAPCOM And that's a down 007, Right. 46 the remainder is NA. Sirius and Rigel. For your linements 047 263 055 and that's two jet ullage for 15 seconds readback.
INTREPID Are you through, Al?
INTREPID Yeah, yeah I got - I got some pictures taken up there.
CAPCOM Houston, Yankee Clipper.
INTREPID (Garble) over at that big mound.
CLIPPER Clipper, go ahead.
CLIPPER (Garble) relay from Pete and Al going to cut me out.
INTREPID Going to bring (garble).
CAPCOM Okay, Clipper, understand. You did not copy all of that PAD is that affirm?
CLIPPER Affirmative. It's impossible with those two yaking.
INTREPID Okay. (Garble) Okay, Al. What are you up to?
INTREPID I'm coming your way, let's start sampling.
INTREPID Okay, I'll be there in a minute. Houston, how long are you going to let us stay out? Hello, Hello, Houston.
CAPCOM Al, Houston. Go ahead.
INTREPID Okay, how long you going to let us stay out?
CAPCOM Pete you'll be extended 30 minutes so you're out for a total of 4 hours and it looks as though you're - okay you've got about 1 hour left and it looks as though we're going to have to close off pretty much with the nominal plan and standby we have some words on the traverse back.
INTREPID Okay, standing over at the head crater. Why don't we start picking up some rocks, Pete, while we wait.
INTREPID Yeah, yeah, yeah. We get a picture of this?
INTREPID Sure do.
INTREPID Great. Get it set up.
INTREPID Okay, are you through?
INTREPID Okay, grab her up, Pete.
CAPCOM Pete and Al, two things we'd like you to do on the traverse on the way back: one is to get samples and some documentation of those mounds, and secondly, if you can, get over to the thousand foot crater which is northwest of the ALSEP and get samples and documentation of that samples from there.
INTREPID Thousand foot crater, suppose that's where we are. Is that that one over there.
INTREPID You don't mean the head crater, do you?
INTREPID Let's get some of this now (garble)

INTREPID Okay.
 CAPCOM Negative. We'll - if you're at head crater
 now we'll give you a radar vector stand by.
 INTREPID You've already got pictures of the (garble)
 at 15 feet. I've been taking it close up.
 INTREPID Okay.
 INTREPID (Two talking - garbled).
 INTREPID Rock around here.
 INTREPID Okay, wait for me because wait -wait (garblee).
 INTREPID I got it, I got it, I got it.
 INTREPID Let me get a picture.
 INTREPID Okay, of that one?
 INTREPID Yes (garble).
 INTREPID (Garble)
 CAPCOM Pete. Pete, Houston. The crater which we
 speak of is -
 YANKEE CLIPPER Are the (garble) going to knock off that
 relay?
 INTREPID Pete, the crater which we speak of is about
 300 feet northwest of Head Crater.
 INTREPID (Garble) Oh, I see it. This, you mean the
 great big one over here.
 CAPCOM That's affirmative.
 INTREPID Okay. Yeah, we can go over there.
 INTREPID Okay, but let's (both talking - garble).
 CAPCOM Pete and Al we'll be talking with Yankee Clipper,
 giving him a maneuver pad for about the next 5 minutes.
 INTREPID Very good.
 INTREPID Let me see that (garbled) You could work
 6 or 7 hours here, never bother you a bit.
 CAPCOM Yankee Clipper.
 CLIPPER All right, Houston.
 CAPCOM Clipper, I got the relay out and we're ready
 to give you the maneuver pad.
 CAPCOM Okay, (garble).
 CLIPPER (garbled)
 INTREPID I got the feeling to when that crater was made,
 it just threw outa big blob of dirt. This is where it landed.
 INTREPID Yeah. (Garble) I wouldn't be suprised to find
 it's that (garble)
 CAPCOM Pete and Al, Houston.
 INTREPID Come in, Houston. Go ahead.
 CAPCOM We're trying to get a maneuver pad up to
 Clipper. He's having a hard time copying it with your talking
 in the back ground. Could you - could we have some silence for

CAPCOM 5 minutes while we get that pad up.
 INTREPID Yep
 CAPCOM Okay, we'll be right back with you. Clipper,
 Houston, are you ready to copy?
 CLIPPER Go, Bill. Lunar Orbit plane change 1, FPS
 GNS 367 33 minus 073 plus 051 119 47 12 54 minus 00 115 plus
 03 496 minus all PIPS roll, pitch and yaw all zero. H sub A
 00 625 plus 00573 03497 018 033 71 05 0026 187 and that's
 Draco Beta. Down 007 Right 46 the remainder is NA. Sirius
 and Rigel -

CAPCOM Roll pitch and YAW 047 263 055, the ullage is
2 jets per 16 seconds. Read back.
INTREPID (garble) 54 00115 plus 03496, all zips, roll
itch and YAW (garble) plus 03497 018 03371 050026, DATA, NOUNS
00.7, right 4.6 017 055. 16 seconds. Over.
CAPCOM Read back correct, Dick.
CLIPPER Okay, thank you.
CAPCOM Pete and Al, we're back with you.
INTREPID Roger, Roger, we're almost over to the
1000 foot crater.
CAPCOM Roger.
INTREPID Got about another 200 feet to go. You can see
these linear patterns frequently on the surface, Houston. They
seem to generally run from the north to the south, and they're
just little lines in the dirt, sometimes you see a large area
like the area right now, it looks like it had a fresh impact
not too long ago. Let's take a picture of this one, Pete.
CONRAD Hey, I got something right here.
BEAN Okay.
CONRAD Looks like a secondary impact crater that
occurred recently.
BEAN Yah, they do don't they?
CONRAD They do. Looks fresh, doesn't have that old
look like the rest of them.
CAPCOM Roger, Pete and Al. We copy that. We show
that you are 3 hours and 7 minutes into it, into the EVA, and
we'd like you back to the LM to start the closeout in 10 min-
utes at 3 plus 17.
INTREPID Holy Christmas, we're going to have to smoke
there, Houston.
CAPCOM That's affirmative.
INTREPID Yah, we're almost to the crater. Okay, we're
not getting very many rocks by going this far, but if that's
what you want, that's what you want. Run baby. When we start
picking up, we'll try and get a larger -
INTREPID Looks like a brilliant spanking new impact
crater, look at that little fella, huh.
INTREPID Sure does doesn't it.
INTREPID Yes, let's get some rocks right here, here's
some. Take some pictures first. Get some pictures of that
crater and I'll get some over there, this one right here.
INTREPID Okay.
INTREPID Wonder why these look so fresh? Must just be
the difference in material. It sure does look fresh though,
doesn't it? There's a rock for you.
INTREPID Okay. Listen, we need to find a grapefruit,
too, you know.
INTREPID There are a lot around.
INTREPID Made a dent in this rock. Whoops, wait a
minute, I dropped it. Hold it. Move on a little bit, move
on, move forward. (Garble) Oh, my God, let's go.

INTREPID Get right to the edge of this crater and photograph it, and put a pan in it and then we won't have to come back this way. Look there, that crater is spectacular isn't it? Wow, look at that rock, I'd like to -

INTREPID We may want to go back there tomorrow, but we can't go any further. We'll never get back in 10 minutes. Hey, there's bedrock down here a little ways.

INTREPID Where?

INTD Right down here.

INTREPID You're right.

INTREPID That's 50 yards.

INTREPID Here I go. Hey, good show - you're right. Here just a minute I'm going to get in here, I've got to go to intermediate cooling.

INTREPID Okay.

INTREPID You can only run so far on this.

INTREPID Don't they look like looking into zero phase?

INTREPID Yes. Now wait a minute. Now, I want to go ahead in PAN.

INTREPID Let me get this 74. 74, dead ahead, right? 50 and you're looking over there, 8 over there, and 11 right there and 8 over there. 1-2-3- you'd better believe it, 5. Now let me go back to 11.

INTREPID We're going to have to smoke to get back there. That LM is a long way. There we are. Got to get some strength. Got it. Got some rock down here, looks like.

INTREPID Okay, now let go down over here. Give them a stereo of this baby. Reach over here a ways.

INTREPID Houston, we're looking down at this big crater now, and it looks rather old, and it has bedrock on the bottom.

INTREPID There are some big boulders that are resting inside the rim, like we see on a large crater that - further to the west side - we don't see any outcrop of rocks either that we could look down and - say well from the top of the rim down to about 20 feet or something, and we come to the underlying rocks, but there is this rock that is very large and spread around. We're going to try and collect some of the samples.

INTREPID Yes, I'm going to get some.

CAPCOM Roger, Al, we suggest that you hustle. We show you're 3 hours and 11 minutes, and we'd like you back there around 17, 6 more minutes.

INTREPID We're picking up a couple right now and we're on our way back, just a minute.

INTREPID There's a big block over there. Got it?

INTREPID I can't get it with a tongs.

INTREPID Go pick it up. (garble)

INTREPID Push it over here and I'll get it.

INTREPID Push it over here. Drop it in my bag.

CAPCOM Okay, you got anything else you want to
put in your bag? (Garble) push another one over here.
INTREPID Okay, just a minute. A couple of pixs
INTREPID (Garble) you could get that. Can you have
that (garble).
INTREPID Huh?
INTREPID A couple of days and (garble) here.
INTREPID Wait a minute. Give me that check.
INTREPID There you go. (Garble).
INTREPID Okay. Getting better.
INTREPID Yeah, let's just get this - let's just get
this (garble) good one.
INTREPID If they would give you some of this rock
and hope it's a (garble).
CAPCOM Roger, Pete and Al we copy. We suggest you
start smoking on back there. You're 3:13 and I'd like you
back there in 4 minutes.
INTREPID Okay, we're on our way. Let's go Al, you
dig?
INTREPID Yeah.
INTREPID (Garble).
INTREPID Yeah. Huh.
INTREPID I said the rest of you didn't bunt. I was
looking at that rock, I'm not sure it was up the hill there,
Pete, my distance here because there's (garble). Must of
been 12 hundred 13 hundred feet, huh at least. You could
travel a lot further than that, you know it? You could really
make a long traverse if you had a good (garble) PF.
INTREPID How long do you figure my strides are, 10 feet?
INTREPID No I'd say your - each width only going
about - when you're running normal I think they'd go about
3 or 4 feet but you could just go indefinitely at this pace.
INTREPID Yeah.
INTREPID You don't get tired. See that you land
flat footed then you just push on your toes and then you go.
INTREPID Well, we got that ALSEP up.
INTREPID Now I can get this rock box, we've got to
get some more rocks. Turn us all around (garble) rocks.
INTREPID I'm getting some up here..
INTREPID We'll fill it.
INTREPID Ben, Houston, we're approaching the ALSEP,
heading back to the LM.
CAPCOM Roger, Pete. We copy.
INTREPID Sure made Pete run all the way.
INTREPID Me?
INTREPID Yeah. Move over this way a little.
INTREPID Which way.
INTREPID Over towards your left. (Garble) do it?
INTREPID I thought there were a couple of good rocks
over there END OF TAPE

CAPCOM Copy.
 INTREPID (garbled)
 BEAN I thought there were a couple of good
 rocks over there.
 CONRAD We're about half way.
 BEAN Why don't we grab a couple of rocks
 here?
 CONRAD Alright, here's one right here.
 BEAN Okay, let me get a photograph of it.
 CONRAD Hurry, we're on the way.
 BEAN Coming. Okay, here's a good one. Wait
 a minute.
 CONRAD H
 BEAN Step in and get the picture.
 CONRAD Got it?
 BEAN Got it. There you go. Good work.
 CONRAD Okay. Here's another good one. Hurry,
 take the picture.
 BEAN Okay, you're in the shadow. Step back
 just a little.
 CONRAD I said, forget the picture.
 CAPCOM Pete and Al, we're picking up your
 heavy footprints going by the seismometer.
 CONRAD That's great.
 BEAN Let's get one last shot of this thing.
 CONRAD Look, I got to get going on the rock
 box.
 BEAN Okay, let's go.
 CONRAD Go ahead and get one if you want.
 I feel like my knees are bruised or something. What would
 cause that.
 BEAN Boy, there's a lot of soft land here.
 CONRAD Okay, we within about 300 feet of the
 LM now, Houston.
 CAPCOM Roger, Pete. We copy.
 CONRAD Oh Al, there's a good rock. Halt,
 halt, halt. Look at that. Never saw one like that before.
 Look at that.
 BEAN Okay.
 CONRAD That green?
 BEAN No, it was grinning at me. That's
 why I stopped. Heck with it. Put it in the rock bag.
 Let's go.
 CONRAD Let's go. Okey doke.
 BEAN Here, let's pick up a couple of these.
 CONRAD Okay.
 BEAN Those there are a little different.
 They're more the gabbro type. Wait a second. Wait a

BEAN second.
CONRAD You in? Good show. Let's go.
CONRAD I'd hate to see an LMP laying on the lunar surface. Hey, what's that glass. Look at this. Son of a gun. I gotta have that. Look at that, a pure piece of glass.
BEAN Hey, that's - let's grab it.
CONRAD Oh, come on, hold my hand. Okay? Oh I'm losing. Gotta be pure glass or something.
BEAN Look at those black beads over here we ought to get.
CONRAD They look green to me.
BEAN About 3/8 of an inch in diameter.
CONRAD That's our old friend, the Intrepid.
BEAN Okay, what do I gotta do here? Okay.
CONRAD Okay, I'll tell you something you can do.
BEAN Okay.
CONRAD Take the pan photograph again. I took them at 15 feet I think by mistake.
BEAN Okay.
CONRAD And I'll get the rock box down, all right?
BEAN Okay.
CONRAD Houston, we're back at the LM.
CAPCOM Roger, Al, Pete. We copy. After you get finished with the core tube, Al, we'll have some instructions for you with the TV.
BEAN Okay, Pete, what are the (garbled)
CONRAD The times are on the MESA.
BEAN Okay. They are. Now which PANS do you want me to take? Over here?
CONRAD Yeah, front and over on left and rear.
BEAN 15, 12 each or -
CONRAD You better take 15.
BEAN Okay, will do. I'll take them again.
I'm going to take a few pans if that's okay, Houston. It'll take about an additional 3 minutes.
CONRAD Hey, Al.
BEAN Yes sir.
CONRAD Never mind. Wait a minute. I'm getting it. Now I got it.
BEAN Okay. Put camera in EG.
CONRAD That Surveyor sure looks neat sitting on the side of that crater.
INTREPID Pretty steep (garble)
CONRAD Not going to have any trouble sleeping tonight.

BEAN I'm getting ready to get the other two
PANS, Pete. Be finished in a minute. Okay, still 70 millim-
eter backing them up.

CONRAD We're getting it right now.
Okay, here's RC number 1 coming up.

BEAN On the PANS, get out in a higher place.
Too low for the PANS. Okay, this has got you done
I think. Okay, that's it for the PANS, Pete.

CONRAD Okay. One rock box open.
BEAN Okay, one more set to go. I've got
this bag of rocks on me. You want me to bring them to you
in a minute?

CONRAD I'm having trouble over here with the
rock box holding.

BEAN Okay. If you have a little trouble I
can help you with it.

CONRAD Yeah, this rock box keeps wanting to
go up in the air.

INTREPID You can (garbled)

CONRAD One scaled.

CLIPPER Houston, Yankee Clipper. You have a
DSKY?

CAPCOM Stand by, Clipper.

CONRAD You got to get this core tube, buddy.

BEAN I'm doing it. As fast as I can.

CAPCOM Clipper, Houston. We're watching the

DSKY's.

CAPCOM Just great.

END OF TAPE

CAPCOM Okay, Clipper, Houston. We're watching the
DSKY.

INTREPID Just great.

INTREPID Okay, all the pans are done, Pete. Okay.

INTREPID Come get the core tube.

INTREPID Okay, it worked.

INTREPID Okay. Very good. (Garble)

INTREPID Okay put it in the entrail carrier (garble)

INTREPID I'm just going to lay it in there I'm not
going to -

INTREPID Yeah. Put it in there right now so we can
get these finished. Okay.

INTREPID Hang those on there too. (Garble).

INTREPID Want these hung on there, Pete? (Garble)

INTREPID (Garble) Are you going to put that cord,
measure core tube, (garble) Okay?

INTREPID Okay.

CAPCOM Pete now you're 3 plus 26 into the EVA and Al
we'd like you to hustle, we'd like you back there at the
bottom of the ladder in 3 minutes.

BEAN I'll hustle, I'll hustle.

CONRAD Let me get your rock bag before you get away.

BEAN Okay, get that rock bag. I'll go get this
core tube. I think I can make it in 3 minutes.

CONRAD All right, wait just a minute. If you'd give
me 2 minutes, I'd go over and view our TV (garble). Got the
bag?

BEAN Yeah.

CONRAD Adios. I'll go for the core tube. I'll go
for the core tube over near the TV and I come back by it -

BEAN There you go.

CONRAD Now, you're thinking.

CAPCOM Okay, Al good idea.

INTREPID I sure wish we had more rocks.

INTREPID How's that?

INTREPID I wish we had more rocks.

INTREPID Okay, I'm core tubing it right now.

INTREPID I wish we had more rocks.

CAPCOM Pete, you can go ahead and fill up the
remainder with the finds from that area.

CONRAD Okay. I'll have to wait for Al to come back
anyhow. (garble) There's something I could be doing all this
time and one thing is shut down my water (garble) scoop
material. Atta boy. Houston, we're putting the core tubes
in real good. It's down almost full length now.

INTREPID (Garble).

INTREPID It's a little harder to drive in, you have to

INTREPID Auger it a bit and then pound it, but now it's full length, and let me take a picture of it and that will be it.

CAPCOM Roger, Al. Sounds like you've got the lunar core tube technique worked out.

BEAN I got the record for core tube depth right now. (laughter) in my pocket.

CAPCOM You've got the record for core tube depth and you've probably got the record for swinging pieces of ALSEP across the lunar landscape.

BEAN And would you believe, I've found a use for the big scoop.

INTREPID Okay, here comes the core tube.

BEAN Got the cap ready, Pete?

CONRAD This stuff comes right out. That's all right.

BEAN I'll bring it right back. Houston, I'm coming right by the TV camera. Did you want me to do anything to it?

CAPCOM That's affirmative, Al. First, we'd like to take and put the automatic light control switch to inside, then open the aperture in steps, and leave it 10 seconds at each step.

INTREPID Okay. It's now on inside. Okay, now I'm going to the aperture. Looking almost directly cross sun now, Houston.

CAPCOM Roger. Call it out if you would, Al, while you're doing it.

BEAN F22, Okay, I'm in F22 right now. I'll stay right there for about 10 seconds. Okay, go into the next one. There are not a lot of marks on here, Houston, there are only about 3 marks, I'll just move it a little bit. Okay. I moved it just a little bit, and I'll leave it there for 10 seconds, I'll tell you when I come to the next one. Okay, move it again.

INTREPID Houston, rock box 2 is going into the wide PAD with the milar or whatever it - film or whatever you call that stuff, and the S-band antenna is going on top of it.

INTREPID Okay, that's 5 secs now, Houston. It's been there for about 5 seconds.

CAPCOM Roger, Al. We copy and Pete we copy, you got the rock box over there with the H film from the S-band.

INTREPID Okay, it's now a little past 5/6. Open it up a little more. I'll hand you that core tube in a minute, Pete.

INTREPID Now I'm just looking for things to do. I've got a little bag full of soil and rock box 2. Boy, does that LM look pretty, does that Surveyor look pretty.

BEAN I'm turning it again, Houston.

CAPCOM Roger.

INTREPID It is now just a little bit above 2.2. It's going to be wide open on the next move which is right now. t's wide open.

INTREPID Standing by for some more instructions, Houston.
CAPCOM Okay, Al. Would you do one other thing.
Pick the camera up and invert it, maybe give it a shake or
two, and see if we can get any change.
INTREPID Will do. It's upside down and I'm shaking it now.
I'm still a little concerned about this plug on the back of the
camera, it doesn't look exactly copesetic. It looks like it's
cocked a little bit, and it looks like it could have melted or
something. It might be a problem right in the wiring, there.
Okay, I should connect into what origin.
CAPCOM Okay, Al, and why don't you try moving that wire
on the back and see if that will do anything.
BEAN Okay, I'll try and hold it in for 10 or 15
seconds. Okay, I'm holding it in now.
CAPCOM Hey, Al, I think we've run out of ideas here for
the present time. Let's press on. If you take the camera over
and put it in the LM shade, point it at a dark spot, the darkest
spot you can find, and open the camera way up to 2.2.
BEAN Okay. Will do. Let's go with the core tube
Okay, Babe.
INTREPID Here you are. Take this hammer and core tube.
Got both of them in my hand here. Let me set the camera down
and then I'll help you. Hold on. Atta boy. Camera right here.
What a shame the camera didn't work. That's right, take - put
that somewhere. You can drop it right in this baby right here.
Okay, Pete. Does it look likes the dirt is in there?
CONRAD It looks like the dirt is in there. Good.
Put the cap on that too.
BEAN Got it on unlock here. Okay, unlock. That's
it. That core tube's in the bag. Oh, wait a minute. Give me
my rocks off of here, will you?
CONRAD Sure will. You've got a whole bag full of dirt,
there. What do you want me to do with it?
BEAN I don't know, just give me the bag, the whole bag.
Do we want to change that bit?
CONRAD Let's throw that bit in the box.
BEAN I will.
CONRAD Let me have it. No, no not there. I got it.
INTREPED Hey, that's a couple of neato rocks.
CAPCOM Pete and Al, Houston. We show you are 3 plus
35 in the EVA. Man you've got plenty of consumables so we
suggest that you go at a relaxed hustle to get back in.
INTREPID Okay. It's almost all done. Yeah, we got
it made.
CONRAD Hey, Al. I dropped some of this dirt. Come
here, Al.
BEAN Just a second. Let me move this TV.

END OF TAPE

INTREPID DSKY 8 PM.
INTREPID Dump some of this dirt - come here.
CONRAD Al?
BEAN Just second; let me move this PC. (Garble)
BEAN Okay, forget it. There you go. It's wide
open now; in the dark. Okay, Houston; it's wide open in the
dark.
CAPCOM Okay, Al.
BEAN I feel like the guy in the shopping
center waiting for his wife - okay? I'm standing here holding
2 bags buddy.
INTREPID (garble) (laughter)
BEAN (garble) tangled up in the LEC. Okay, what
I want you to do - no, no, no. Dump some dirt, in this bag.
Dump some dirt in that bag - yeah, yeah, that a boy.
INTREPID How much?
INTREPID Well, just keep going a little bit.
INTREPID Okay.
INTREPID Okay, let me look. All right. Boy, that's
dirt.
INTREPID That's dirt. You better believe it. It's
not going as many rooms as you, but it's good; that's plenty;
hold it. Alright, now, when you shake here all down, I think
the bag's full.
INTREPID Do you want me to just - what do you want me
to do with this, Pete?
CONRAD Lay 'em down. I may need some help from you.
BEAN Okay.
BEAN You want me to help close that box?
CONRAD Yeah.
BEAN Okay.
CONRAD Get it in here.
BEAN Okay. I just sit this here; cause we can
always get it when we need it. Put it right there.
INTREPID Yeah.
INTREPID Hang out on to the box when I stuff it.
INTREPID Okay.
INTREPID I want to make sure I don't grab the field.
INTREPID Okay, go.
INTREPID Hey, you're right; that thing doesn't want
to stuff does it? Kind of uh - ornery. We got to start making
this lunar equipment a little more sturdy. These bags are all
creaking open. Yeah. Where's the ALSEP.
BEAN And there's the rock box that is full of
rocks. Okay, that looks good, Pete. (Garble) out of the way;
better put it in the middle. It's going to be right on that seal -

INTREPID (garble) Gonna have to have the room.
Boy, don't you worry. Okay, is that it?
INTREPID Wait a minute.
INTREPID Okay.
BEAN Looks good. You got a good full box.
CONRAD Okay, close the door. Watch your handle
there; look out your handle.
BEAN Okay.
CONRAD Ahh - dog. You got it Bean. Now just hold.
Hang onto the box. Go.
BEAN Watch it; I don't want to break the table.
INTREPID That's what I was thinking.
INTREPID Hey, that's good. (garble)
INTREPID Don't do it.
INTREPID I got the other one.
INTREPID All right. You're getting (garble)
CONRAD All right; now. Put your camera in ETD.
INTREPID I'm not sure I used up all the pictures
today. Good idea.
CONRAD I don't know how many I took but wait
till the 36 on the earth. (Garble) 140 - let's see, we moved
the saddle bags, we scooped material, we stowed the SRC, we
stowed the core tube, we closed the SRC, we got an EMU check,
comm check - Hello Houston; how do you read?
CAPCOM Loud and clear.
CONRAD Okay - how much time have we got Houston?
BEAN Hold that down just a minute Pete.
CAPCOM Pete - we show that you are 3 plus 38. End
of the EVA and you got a fair amount of consumables so don't
rush too hard getting back in; just do what you have to, and
do it at a safe pace.
CONRAD Okay.
BEAN That's good (garble) Okay, here it is
Buster. Hold it up just a little Pete. Pick it up just a
little.
CAPCOM Pete - would you confirm that you have
the stereo camera over in the sun?
BEAN Is your stereo camera in the sun Pete?
CONRAD Uh- no, just a second.
BEAN Okay.
CONRAD I want to see that first.
BEAN Okay. The EVA - (garble) check command - (garble)
NETWORK One minute to LOS -
INTREPID (garble) too low -
INTREPID Camera - wide pan; - right back too, which
is easily covered.
CONRAD You want it sitting in the sunshine, is that
correct Houston?
CAPCOM That's affirmative Pete.
INTREPID Take a picture.
BEAN You're bothering your S band.
CONRAD Did I hit it?
BEAN Yep, you got your left foot on it.

CONRAD Ruin the S band?
 BEAN I don't think so but you ought to check
 it before you go in.
 CONRAD Okay.
 BEAN Don't think you did; but the danger is great.
 INTREPID (garble)
 INTREPID Walk around and check - Ha Ha Ha
 INTREPID What happened.
 INTREPID Getting in a hurry - da-da-dum.
 CONRAD Hey Al.
 BEAN Yeah, I'm coming.
 CONRAD Oh, okay. I don't like to come across that
 area; that (garble) is too tender.
 INTREPID Okay, get back.
 INTREPID Thank you. That's good. Go ahead.
 BEAN That's a pretty good idea; putting that coil
 over there. Let me check the SP.
 CONRAD Okay - and then we ought to dust each
 other off and get in.
 INTREPID Man, we are filthy.
 INTREPID We need a brush - a whisk broom.
 INTREPID Okay - S band antenna, lunar stay; would
 you like to get in there and try that.
 INTREPID Okay, all I've got to do is get in, soon
 as we dust off.
 CAPCOM Roger Pete.
 INTREPID Okay, we're looking at the earth. Yeah,
 Pete; go ahead.
 CONRAD Okay, dust me off, and I'll dust you off
 and we'll get in.
 BEAN I don't know what good you're going to do.
 Hey, it does dust off a little bit. Doesn't it? Can you tell?
 That loose stuff - come over here by the ladder - where it
 isn't in the dark -
 INTREPID No - I can see. Come over here by the
 ladder - there you go.
 INTREPID Oh, I see why; you get it lower that way.
 INTREPID Yeah.
 INTREPID Good idea.
 INTREPID Kick your boots real hard when you -
 INTREPID Okay.
 INTREPID Okay, now turn around this way - other way.
 INTREPID I can crawl up the ladder half way and get
 my upper - (garble).
 INTREPID There you go. Go ahead and do that; it's
 a good idea, can you see anything out above me?
 INTREPID No - I can't.
 INTREPID Just go ahead and start up the ladder.
 INTREPID Okay.

INTREPID (garble) Apollo 12. You didn't quite make it.
INTREPID (garble)
CAPCOM Al, would you give us a mark when you
are on the foot pad?
CONRAD Wait a minute, wait, wait.
BEAN Roger; I'm off the foot pad right now; I'm
standing on the ladder, Pete's dusting the boots off; trying
to keep some of this dust out of the LM.
CAPCOM Roger Al; thanks.
BEAN Man, is this dusty. Just hold still for awhile.
CONRAD Wait - wait - wait - wait.
BEAN A couple -
Conrad Yeah, but let me brush.
BEAN You can get rid of a lot of it kicking that
way. Okay, let me get your sole here.
CONRAD Okay; go ahead on up.
INTREPID Okay. Here's this stinking television
wire again. There we go.
CONRAD I'll help you back here as best I can.
BEAN That's a good idea - I've got to raise my
gold visor here so my protector visor down.
CONRAD Now, see the hatch when you come up; take a
good look at the hatch.
BEAN I'm gonna have to be tender about it; cause
I'm not sure we are not gonna want to put some tape over it
or something.
CONRAD Okay - follow again. Raise your rear end;
at a boy, got her. Do a push up right into the (garble)
BEAN I'm in.
BEAN Very good. In the hatch, Houston.
CAPCOM Roger Al; copied you are in.
CONRAD Okay; maybe you're old friendly third will
get the ETD.
BEAN Okay, just a second. Let me get my gear.
Okay. Just a second.
CONRAD An ETD and two camera's ready to come up.
INTREPID Oh, there's my (garble) again.
CONRAD Al Bean?
BEAN What? This thing is going to drive me buggy.
Guess what.
CONRAD Houston?
CAPCOM Go ahead, Pete.
CONRAD Do you want me to switch over to lunar stay
antenna? Do you want me to switch to lunar stay antenna right
now?

END OF TAPE

CAPCOM Go ahead, Pete.
CONRAD You want me to switch over to the lunar stay antenna? You want me to switch to lunar stay antenna right now while he's on the surface? Over.
CAPCOM Roger, that's affirmative, and track mode off.
CONRAD Okay, I'm going to lunar stay right now. We may lose comm for a second, but if I don't hear from you, I'll come back up.
CAPCOM Roger.
CONRAD Stay. Houston, Apollo 12. How do you hear on lunar stay?
CAPCOM Intrepid, you're loud and clear. Sounds like Pete did the job.
CONRAD Sure did. Get all signals straight Houston? Go ahead and start EDV up.
CONRAD I just did. Abord track modes are off.
CAPCOM Roger.
BEAN Just a second, Pete. I haven't got the EV rigged. One second.
CONRAD Okay.
CAPCOM The Intrepid signal strength is good.
BEAN Okay.
CONRAD As a matter of fact, you sound stronger, Houston.
CAPCOM I believe so, Pete.
CONRAD (garbled)
BEAN Got it. We've got it. Wait a second. Let me clear a nice little room here for it. Pete, are we going to jettison this garbage bag again for this EVA?
CONRAD Yes sir.
BEAN Okay, let me get it in good position.
CONRAD Why don't you throw it out right now?
BEAN That's a good idea.
CONRAD You might get rid of it.
BEAN That's a good idea, just move it out of the way.
CONRAD That's a (garbled) one.
BEAN Okay, here it comes.
CONRAD Just a second.
BEAN Okay. Just a second.
CONRAD Don't worry about it.
BEAN Okay, (garbled). Get it when you come up. Power up engine.
CONRAD Just a second.
BEAN Let me try something that might be just easier on all of us. Oh, I don't have to bring that on the pulley. I can just pull it up, Pete.
CONRAD That doesn't weigh anything.

BEAN That's right. We could pull. It's easier anyway.

CONRAD Wait a minute. Go ahead, pull. 1, 2, 3. Atta boy.

BEAN Hey, I got an idea. Now, you pull.

CONRAD Wait a minute. Now, it's making a mess. Never mind. Keep on pulling.

BEAN Okay. Okay, just a second.

CONRAD All right.

BEAN Here comes the transfer bag.

CONRAD In.

BEAN Secured. Okay, bring her on back, Pete.

CONRAD Okay. Wait, wait. Don't let it get hung up. Coming. Let her go. No, wait a minute now. You keep it tight. See, you can't do it that way, Al. Take it easy. Let's do that slow. That's a boy. That's a boy. Now, now you can let go of it.

BEAN (garbled)

CONRAD We got 1 rock box coming up. Okay, Al. Easy does it, easy does it. Wait a minute now. Easy does it, easy, easy, easy. You're pulling when I don't want you to pull. Okay, now pull. Okay, now we gotta give it the heave ho, ready? 1, 2, pull.

BEAN Got it made. Okay, lift her up a little bit, Pete. Okay, let it come forward.

CONRAD That baby is heavy.

BEAN It's right in the door though. It can be shoved right in here.

CONRAD Okay. Okay, Houston. One rock box inside.

CAPCOM Roger, Pete, copy. One SRC in.

BEAN Okay, bring her out.

CONRAD Okay. Wait, wait, wait, wait. See, it's like playing with a snake. Okay, that's a boy, now. Easy does it. You know that's good stuff to put it over here in the (garbled). Okay, now, down. Now, you're going to hang on to it and hand it to me, right? So I can tie it on the porch?

BEAN That's right.

CONRAD Okay. Am I dirty. Okay, Houston. What do you want me to do? Get in?

CAPCOM That's affirmative, Pete. If you've got the ETB and the rock box in, then climb in yourself.

CAPCOM Intrepid, Houston. Intrepid, Houston.

CONRAD You all ready for me to come in, Al?

BEAN I'm ready if that's what you asked.

CONRAD Wonder what happened to Houston. I'm not sure that that lunar stay didn't do it. I'd better go back on track and get them back. Okay.

CAPCOM Intrepid, Houston. Stand by.
CONRAD Okay, what's your problem?
CAPCOM Okay, we had a changeover from one site to another down here. It was all on our end. No problem with your antenna. It's working well.

CONRAD Okay, you guys ought to call those things out. Man, they've been happening all the way through this flight.

CAPCOM Roger, Pete. We concur, and go ahead and press on on the ingress.

CONRAD Okay. Houston, MARK. I'm on the footpad.

CAPCOM MARK.

CONRAD That was easy.

BEAN I just closed my feed water. You might want to do that too.

CONRAD Probably a good idea. Let me see if I can find it back here. Okay, I just closed mine. Coming up the ladder.

BEAN Gosh, you're shaking the whole LM.

CONRAD Sorry about that.

BEAN We get a warning, because you haven't got your feed water. We haven't got to it for quite a while.

CONRAD Yeah, understand. Okay, one garbage bag.

END OF TAPE

INTREPID Okay, one garbage bag. Anything else
that you want to get rid of?
INTREPID Not a thing. All right, hand me the
LEC.
INTREPID Okay, the LEC's got kind of a little
slip knot in it because the -
INTREPID Got it?
INTREPID Yes.
CAPCOM Pete, on your way through the hatch
will you give a check on the seal?
INTREPID Check on the seal.
INTREPID Okay, I can see it probably better
than he can from this side, Houston. Seal looks real good.
I'll tell you what we should do. When we got out - I can't
believe I did that.
INTREPID Yes you did, cause I remember - we
had it in the air and then when I backed up I could - I'll
tell you we probably just ought to put a piece of tape over
it.
INTREPID Okay (garbled) There's a can on the
hatch and for about a 10 inch cut there and it didn't hurt
the insulation, didn't hurt the hatch, and I don't know whether
you want us to put a piece of tape on there or just forget
it. It doesn't look like it's bothering anything.
INTREPID I say just forget it.
INTREPID Okay, Pete.
INTREPID Why don't you get over on your side.
INTREPID Okay. Move over.
INTREPID Just checked your circuit breakers,
they're all good.
INTREPID All right.
INTREPID 50 seconds, not out of the way yet.
INTREPID All right, but I want you to hold the
door for a minute while I close this front.
INTREPID Well, I've got to get out of the way.
INTREPID - thing here.
CAPCOM Pete, we concur, no tape.
INTREPID All right.
INTREPID Okay.
INTREPID Okay. Now wait a second, Pete. Let
me back up a little better.
INTREPID Okay, tell me which way to go.
INTREPID Just a second. Okay, you're just
perfect. Shoot right on in. Put your chest down and your
rear end up - there you go, got it. Go a little bit to the
left. Get a little further till your head bumps. Do a pushup
and you're set - little bit to the left, little bit further
to the left. That's is. Up.
INTREPID (garbled)

INTREPID Okay.
INTREPID You're in the best possible position.
In a little more - and then you've got it.
INTREPID I'm in, no sweat.
INTREPID Okay, then careful when you turn around.
You've got -
INTREPID Yes.
INTREPID (garbled)
INTREPID Okay. Boy, you look dirty.
INTREPID Ummm. You do, too.
INTREPID (garbled) I'll get the hatch. Okay,
it says feedwater closed. We did that. Forward hatch closed
and locked. When you're out of the way I'll slide over and
lock.
INTREPID Am I out of the way?
INTREPID Not yet.
INTREPID Wait till I turn around.
INTREPID Just a minute.
INTREPID Okay?
INTREPID Okay.
INTREPID Get on my hands and knees and lock this
thing.
INTREPID Yes. Need to push down.
INTREPID Just a second, let me raise my visor
and let's see what's going on in here.
INTREPID Okay.
INTREPID Can you give me a push-me-down?
INTREPID I am pushing you down. Need further?
INTREPID Just back up and let me tilt further
forward. This is just as good.
INTREPID I can't go back any further. Why
don't you let me close it, okay?
INTREPID See if you can reach it.
INTREPID It's just a little bit out of my reach,
you might be able to get it.
INTREPID Okay, easy.
INTREPID I'm ready.
INTREPID Let me get back around. Watch your
PLSS. There you go.
INTREPID Hatch closed.
INTREPID Did you get it?
INTREPID Yes.
INTREPID Good show.
INTREPID Okay.
INTREPID Okay, next one. Dump valve both AUTO.
I've verified this one, verified that one.
INTREPID (garbled)
INTREPID It could come first.
INTREPID Okay.

INTREPID (garbled) 02 and press box may come on
during repress. If (garbled) less than 2 percent, manually
control cabin repress to maintain positive PGA pressure.
Forget it. Okay, light enunciator and (garbled)

INTREPID Wait a minute. There you go.
INTREPID Okay, now I'm going to go over here,
over just a little so I can turn around.
INTREPID Oh, you did your circuit breakers.
INTREPID The best I can, easy does it.
INTREPID What are you trying to do?
INTREPID Get that stop button depressed.
INTREPID Yes.
INTREPID Pete, I've got to turn around.
INTREPID The repress valve.
INTREPID Okay, well, I can reach the depress
valve if you want.

INTREPID No, I've got it here.
INTREPID Does it.
INTREPID Why don't you reach it? It may be better
if you could. Can you reach up and repress in what, auto?
INTREPID Cabin repress to AUTO.
INTREPID Pressure S, A and B to cabin.
INTREPID Okay.
INTREPID Master alarm in cabin repress. Lets
watch the pressure.

INTREPID Cabin pressure is starting up.
INTREPID (garbled)
INTREPID There it is.
INTREPID Huh?
INTREPID Pumping in good.
INTREPID (garbled)
INTREPID Repress is looking good.
PAO Cabin pressure 2 pounds.
INTREPID (garbled) PLSS 02 off.
INTREPID (garbled)
PAO 3 pounds.
INTREPID Have you verified that I've got mine
off?

INTREPID What?
INTREPID Will you verify that I've got mine off?
PAO 4 pounds.
INTREPID I'll pulling the (garbled) valve up,
have checked the water, and you do have it up.
INTREPID Okay, Houston, and the cabin at 4.6.
INTREPID Okay, master alarm. Let me turn it off.
CAPCOM Roger, Pete, we copy you. We show
that down here.

INTREPID We depressed suit as required.
INTREPID Nearly operates yours, too.

INTREPID Okay.
 INTREPID (garbled)
 INTREPID Okay.
 INTREPID Okay, cabin repress valve closes at 4,
 we have cabin press stable, (garbled)
 INTREPID (garbled) returned to AUTO.
 INTREPID Okay, cabin gas return AUTO.
 INTREPID Wait a minute.
 INTREPID Get over here.
 INTREPID Okay.
 INTREPID AUTO suit circuit relief AUTO.
 INTREPID It's already AUTO.
 INTREPID That's right. (garbled) diverter, push
 cabin.
 INTREPID Push cabin.
 INTREPID Verify EVA circuit breaker configuration
 on your side suit fan number 1 closed.
 INTREPID Okay, just a second. Suit fan 1 closed
 and I'll close the suit fan DELTA-P.
 INTREPID Okay.
 INTREPID And I'll also - notice ECS (garbled)
 step, have they got them, and count TV open. Houston, do
 you want me to turn off the TV or leave it on?
 CAPCOM That's affirmative, Al, turn it off.
 INTREPID Okay, and it says doff helmets, gloves,
 visors and all that, and let's go off relay. We're going off
 relay right now, Houston.
 INTREPID How do you want me to go, Al?
 CAPCOM Roger, copy you're going off relay.
 CAPCOM Intrepid, Houston.
 CAPCOM Intrepid, Houston.
 CAPCOM Intrepid, Houston.

END OF TAPE

CAPCOM Intrepid, Houston. Intrepid, Houston.

PAO This is Apollo Control. It will probably be a few minutes before we have communications back as the crew reconfigures their communications equipment from the backpacks to the LM system.

CAPCOM Houston.

PAO This is Apollo Control. The participants in the Apollo 11 News Conference are on their way to the large auditorium at this time. That News Conference should start shortly in the large auditorium.

CAPCOM Intrepid, Houston.

PAO This is Apollo Control at 119 hours, and 19 minutes. The Flight Surgeon reports that the Btu expenditure on Pete Conrad was 900 Btu's per hour. On Al Bean 1000 Btu's per hour. We do not have heart rates yet; we will pass them along as soon as we get them. We will be taking this line down when the Apollo 11 crew news conference starts. We will tape during that news conference and turn those tapes over to the transcript typist. Yankee Clipper is scheduled to make a plane change to put it in the same plane as the LM at liftoff time.

YANKEE CLIPPER VHF A OFF. B RECEIVE. VHF A OFF.
B RECEIVE. Mode ICS pushed to TALK.

PAO That plane change coming at 119 hours, 47 minutes, 12 seconds. With the service propulsion system out of plane to the north Delta V of 349.7 feet per second, burn time of 18 seconds. This will move the ground track of the Command Module 3 and 1/2 degrees north of the present ground track at the landing site. 3 and 1/2 degrees north at the landing site.

INTREPID Okay. We are not going to worry about it right now. Let's get out - we want to get out of all this gear and we will talk to you later.

CAPCOM Roger.

INTREPID We are both connected to left com. Okay. Audio committed at VHF A - OFF. B - RECEIVE. A is OFF. B is RECEIVE. Mode ICS PC relay OFF. A COM VHF, off, off, off, on left (garble). Recorder OFF and uplink squelch OFF. All done? Okay. Verify decent O2. Okay. Connect O2 supply to LMP first. Just a minute. Let me ease over here. How did that get undone? Did you undo it?

INTREPID O2. O2. What are you going to do? Oh, you don't want a CONNECT yet. You are going to have to turn around this side to me. Right? Yeah. Yeah. Yeah, you are going to have to turn all the way around that way. Atta boy.

END OF TAPE

INTREPID Okay.
INTREPID Turn on - wait a minute.
INRRREPID Open and then close after 2 minutes.
INTREPID I'll do it on my mark. B MARK.
INTREPID Hey, Al Bean. That was a hell of a
show. Too bad the TV didn't work. Did you recycle that
stop button. I'd feel a lot better.
INTREPID I can't see it from here, Al. I have
to wait.
INTREPID I think you tend to underestimate.
This is -
INTREPID You've still got - you've got to go
2 minutes. Hey, I heard that. You've got a ball joint in it
or something. It's a good thing the TV wasn't working.
INTREPID Yes. I got a lot of pictures of you
around the ALSEP. I've got good pictures of you.
CAPCOM Pete, we're reading you on VOX.
INTREPID You've got 2 minutes. Turn her off.
Intrepid Okay.
INTREPID Don? Just a minute.
PAO We've 5 minutes away from acquisition
of the command module, Yankee Clipper. This is Apollo Control
at 119 hours, 30 minutes. We will take the line down now
for the news conference.

END OF TAPE

INTREPID Madrid LOS CSM. Madrid, go for command CSM.

CAPCOM Yankee Clipper, Houston.

YANKEE CLIPPER Go ahead. Clipper, here.

CAPCOM Clipper, you were sort of a forgotten man for a little while. We're all - all eyes are on you now.

We're with you. Clipper the EVA went -

YANKEE CLIPPER Ok, I've got - you're coming up on 2 channels, I've got an echo.

CAPCOM Yankee Clipper, how do you read?

YANKEE CLIPPER There you go. Now, you're much clearer.

CAPCOM Roger. They completed the EVA with a 4 hour one minute EVA and they got all of the objectives accomplished. They did a real swell job. We're watching you, Dick.

YANKEE CLIPPER Right (garbled). I guess I'll go VOX. It'll be easier for you people to follow. I'll read off my checklist as I go down it.

CAPCOM Roger, Dick.

YANKEE CLIPPER Nobody is checking on me today.

CAPCOM We're watching you now, Babe.

YANKEE CLIPPER Okay, I'll have everything done to 6 minutes, it's all done.

CAPCOM Roger.

YANKEE CLIPPER Okay, I'm going to slide across the bar-room and get the buss ties.

CAPCOM Roger.

YANKEE CLIPPER Okay, the buss ties are on it. MTVC SERVO power 1AC Main A, 2AC 2 Main B. With this I control the power normal 2AC. Direct power OFF. B MAX C (garbled) 1 2. Spacecraft control stands CS. Rotatory control number 2 is armed. We'll go into primary TDC check. LOS number 1 pitch 1. That's about it. 1 yaw 1, I've got it. I've trimmed pitch. I've had trim and yaw. Trim is set minus 73 plus 51. I have MTVC. Spacecraft control is CMS, trim is zero. (garbled) controller clockwise No MTVC. (garbled) number 2, pitch mark. I got it. Yaw 2 mark, I got it. Trim is satisfactory. MTVC is satisfactory.

CAPCOM Intrepid, Houston. Go ahead.

INTREPID Roger. How far behind time are we?

CAPCOM Stand by Intrepid, we're coming up on a burn with Dick right Now. About 4 minutes and 30 seconds away.

INTREPID Okay, we'll go on the LCS.

CAPCOM Roger.

YANKEE CLIPPER Okay, it's trimmed. Net 1 read 2 entered. That one reads (garbled) plus 2 minus 2, 0 plus 2 minus 2, 0. In four seconds I'll have trim, I hope. Okay. That's Trim. 3-47 and counting. (garbled) 55. Limit cycle is OFF. Ring is high. Tis one second fast.

CAPCOM Clipper, Houston. As a reminder, we'd like to

CAPCOM - have all thrusters ON.
YANKEE CLIPPER Thank you. All thrusters ON.
CAPCOM That's affirmative.
YANKEE CLIPPER What do you mean?
CAPCOM We show that some of your roll thrusters are disabled.
YANKEE CLIPPER (Garbled)
CAPCOM Roger.
YANKEE CLIPPER (Garbled) thrust A is nominal.
I appreciate controller's (garbled) Standby for LSG.
CAPCOM You're looking good here, Dick.
YANKEE CLIPPER Thank you. Must be (garbled). (garbled) is normal. (garbled). Proceed. Thrust OFF. (garbled). Looking good. Shtdown. A and B are OFF. Watch the gimbal motors for me. (garbled). (garbled) is OFF. (garbled) is OFF. Fifth one is OFF.
CAPCOM Good. All gimbals OFF.
YANKEE CLIPPER (Garbled) residuals, but I'm off in altitude right now. Okay, thank you.
CAPCOM Clipper, no Trim.
YANKEE CLIPPER Okay. I'm off in attitude, but (garbled) anyway. (garbled).
CAPCOM Roger.
YANKEE CLIPPER Now, are you watching the orbit?
CAPCOM We're watching you, Dick. We'll give you an update.
YANKEE CLIPPER There it is. And Abscnider is 32.9, (garbled) is 32.7. The MLS is increased 75.
CAPCOM Roger, Dick. We copy.
YANKEE CLIPPER (Garbled) 8.4.
CAPCOM Roger. Copy. Would you give us P00, please, Dick? Intrepid, Houston.
INTREPID Go ahead.
CAPCOM Intrepid, plane change burn was good, and we show that you're about 1.15 behind in the flight plan.
INTREPID Okay. That's not too bad. We'll pickup.
CAPCOM Intrepid, Houston. Would you give us P00 and accept for a liftoff REFSMMAT?
INTREPID Okay, Houston.
CAPCOM Clipper, the computer is yours.
YANKEE CLIPPER Thank you.
CAPCOM Yankee Clipper, Houston. Sure will.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69 10:40 AM CST GET 120:02 335/1

CAPCOM Yankee Clipper. Houston.
YANKEE CLIPPER Go ahead.
CAPCOM Dick, we would like you to go to REACQ
at the present time and resignal and then go back to AUTO.
For the sleep period we will have you go to the OMNI.
CAPCOM Dick. Let's go back to AUTO.
CAPCOM Intrepid, Houston.
INTREPID Go ahead.
CAPCOM Intrepid. Your last step on post EVA
1 card, where you reverse the O2 hoses. We suggest that is
a good time to check for the water.
INTREPID Okay, Houston. We are just about at that
step right now where we are reconfiguring the cameras. Keep
you posted. The PLSS's are all recharged and batteries are
replaced, LIOH cannisters and first O2 charged.
CAPCOM Roger. We copy.
PAO This is Apollo Control at 120 hours,
11 minutes. We now hear from Dr. John Zieglschmid, the heart
rates for EVA. Pete. Our intent on that comment about the
PLSS O2 hoses is to be assured that those hoses are straight
and that you do get all the water running out of them, that
there are no low places in the hoses in which the water can
lie.
INTREPID Okay. Drain the hoses. That is the
idea. Okay?
CAPCOM That's affirmative.
PAO The average heart rate for Pete Conrad
throughout the EVA period was 105. His high was 150. His
low was slightly less than 80. The average for Al Bean was
121. His high - 151. His low - 82.
CAPCOM Yankee Clipper. Yankee Clipper. Houston.
On the high gain MANUAL we need - PITCH, minus 31. YAW - 241.
Correction on the YAW. That's 247.
YANKEE CLIPPER Hello Houston. How hear us now? High
gain.
CAPCOM Got you loud and clear.
YANKEE CLIPPER Now this thing is acting up. Better
watch it.
CAPCOM Roger. And the REACQ code you went off.
YANKEE CLIPPER It won't hold it in AUTO either. Just
use MANUAL.
CAPCOM Roger, Dick.
INTREPID I think they are gone. We can go back
to high battery.
CAPCOM Say, Dick. That was a fantastic job
you did on picking up the Surveyor and the LM. Very well
done. Caught the burn change - the point change on the burn.

APOLLO 12 MISSION COMMENTARY, 11/19/69 10:40 AM CST, GET 120:02 335/2

CAPCOM You have been doing a good job.
YANKEE CLIPPER Thank you sir.
CAPCOM Clipper. Omni, Bravo.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 1193500, CST 1001 336/1

CAPCOM Yankee Clipper, Houston.
CLIPPER Go ahead, Houston.
CAPCOM Dick, the burn looked real good on
PGNCS. We'll be tracking you going across here and it all
looks good for the liftoff. Have a map update for you,
rev 20, when you are ready to copy.
CLIPPER Okay.
CAPCOM Rev 20, 120465312111531213305.
CLIPPER Okay. I copied that.
CAPCOM Roger, Dick.
CLIPPER (Garble) this high gain antenna
(garble).
CAPCOM Stand by on that.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 1201700, CST 1039 337/1

INTREPID Houston, we're going to modulate PM.
CAPCOM Intrepid, ready to copy.
INTREPID We aren't supposed to modulate PM.
CAPCOM Roger, Pete.
CAPCOM Clipper, Houston, would you confirm you're
on OMNI BRAVO.
CLIPPER (Inaudible because of static)
CAPCOM That's affirmative, Dick. Go OMNI
BRAVO present time.
CLIPPER Houston, Yankee Clipper. I just got
a master alarm on the pressure warning display.
CAPCOM Okay. Yankee Clipper. Roger.
Copy master alarm.
CAPCOM Yankee Clipper. We see nothing down
here. You're still looking good.
PAO This is Apollo Control at 120 hours,
34 minutes. Yankee Clipper has 12 minutes acquisition time
left in this 19th lunar revolution. The crewmen of Intrepid
are recharging the portable life support systems, refilling
with oxygen and getting the LM reconfigured. After they
complete that, we will have a short debriefing session
between the ground and the Intrepid on this first EVA.
Mission Control Center flight controller teams will change
shifts right after that briefing. We are estimating the
change of shift news conference for 11:30 a.m. central
standard time.

END OF TAPE

YANKEE CLIPPER Houston.
CAPCOM Yankee Clipper, Houston. Did you call?
YANKEE CLIPPER Intrepid (garble)
CAPCOM Clipper, we copy that P52 torquing
angle.
YANKEE CLIPPER Okay. Thank you Charlie. Over.
INTREPID Pete, you'll never believe what we've
been doing for the last 35 minutes.
CAPCOM Well, go ahead.
CAPCOM We're waiting.
INTREPID I am going to take this 35c scale
that they sent out here to weigh these bags with and break
it over somebodys head.
CAPCOM I take it you're having a malfunction
with the bag.
CAPCOM The bag and the scale?
INTREPID It's not - no just the scale. The
nut came off the top of the adjustment and that's the end
of the scale.
CAPCOM Pete, we are busy activating the scale
experts.
INTREPID Hey, tell me where they stowed the pliers.
CAPCOM Standby, Pete.
CAPCOM Pete, our first cut on the plier
location is in one of the PPKs.
INTREPID Roger.
CAPCOM Pete. It's in the lower lunar boot
compartment.
CAPCOM Yankee Clipper. One minute to LOS.
YANKEE CLIPPER Roger.
CAPCOM Yankee Clipper, Houston.
CAPCOM Intrepid, Houston.
INTREPID Go ahead, Houston.
CAPCOM At

INTREPID Houston. One RCU weighs 3.8 kilograms on this pickle brine scale.

CAPCOM Copy. 3.8 kilograms.

INTREPID Well, if that's what KG stands for on the top of the scale. I'm sorry. Make it .38 - .38.

CAPCOM Roger. We copy .38. You had us wondering down here - a few of us. The Metric fellows were wondering.

INTREPID Me, too.

INTREPID This bag is really filling up, Houston.

CAPCOM Roger, Al. Was the CDR's?

INTREPID That's right.

CAPCOM Intrepid, for your information. Your EVA went 4 hours and 1 minute and Al, you were the shortest in terms of quantity remaining. Your PLSS H2O was down to 47 minutes remaining, and Pete, your O2 was most critical on you. You still had 2 hours and 7 minutes left.

INTREPID Okay.

INTREPID Okay, Pete's water bag weighs .26 kilograms.

CAPCOM Copy. .26.

INTREPID Say, Houston. While we're doing this, what was our Btu output level, do you figure?

CAPCOM Standby.

INTREPID I say, what Btu level do you think we were working at?

CAPCOM Pete, you averaged out at 900 Btu and Al, you averaged out at 1000.

INTREPID What kind of signals are you getting from the ALSEP? Is that running all right?

CAPCOM That's affirmative. It's running real well. The PSC and LSM are up and working, and they're just going through the activation phase for the remainder.

INTREPID Okay.

INTREPID .17 kilograms for the LMP's water.

CAPCOM .17. Got it.

INTREPID And, Houston. I'm going to go ahead top off our PLSS's, and while we're doing that, I guess we ought to get into our EVA debriefing with you.

CAPCOM Roger. We're standing by for that.

CAPCOM Intrepid, Houston. We also have your liftoff block data for revs 20 through 24.

INTREPID Wait one. Go ahead, Houston.

CAPCOM Okay, Intrepid. Liftoff block data revs 20 through 24. 20 T-8, 122 19 32. 2 T-9, 124 17 54. 22 T-10, 126 16 13. 23 T-11, 128 14 34. 24 T-12, 130 12 59.

INTREPID Roger. Copied. 122 19 32, 124 17 54, 126 16 13, 128 14 34 130 12 59.

CAPCOM That's correct, Al.

INTREPID Say, Houston. I'm a little bit puzzled about that TV camera. Do you think that that's some sort of mechanical failure or are we pointed at the Sun too much.

CAPCOM That's a question right now that we're trying to figure out. We got mechanical and vidicon burn people taking sides. We're not sure right now.

INTREPID We got lots of room. We'll bring it back for you.

CAPCOM That is a possibility, Intrepid.

INTREPID Say, Houston. Do you have any questions that you wanted to ask us about the EVA?

CAPCOM That's affirmative. We'd like to get your comments first if we could and then we'll take up the questions and recommendations that we can come up with.

INTREPID Okay, my first comment is that I got water in both of my boots, and it's driving me buggy.

CAPCOM Roger. Copy. Water in the boots.

INTREPID My second comment is that the EVA went pretty well as planned. I think that most everything, once we got to a task the way we had practiced it back there, we got it done. It was kind of the unforeseen, as usual, which almost got us behind. I will say one thing. It very definitely took about 10 minutes or so to adapt to what was going on, but as soon as I did, I really got the hotfoot, and I think that Al felt the same way.

CAPCOM I think from our end down here, Pete and Al, you did a tremendous job. You were able to go along, as you said, on the nominal things and take care of the off nominal also. There were quite a few points where you might not have met the objective, had you not played "heads up" ball.

INTREPID Yes. That's the handy of having a hammer aboard. My heart was in my throat when he couldn't pull that cask out of there. I mean the element out of the can.

CAPCOM Al, you should have been a surgeon.

INTREPID As far as the geology goes - that was me that was beating with the hammer, not Al. As far as the geology goes, we really didn't have a chance to look too hard, but I think it's very obvious that there are a variety of different kinds of rocks. I would also like to say that I think that we're in a most favorable position to get to the Surveyor. I don't think we want to walk down the crater wall from the crater wall side that the Surveyor is on. I think what we want to do is walk down in the crater, right from the LM, across the bottom and walk up the Surveyor. It looks far too steep to approach from the other side, near the upper part. That's number one. Number two, I think that we're pretty well game for any kind of traverse, that you want us to make.

INTREPID You know what we can do here in a few minutes is sit down with our book, and put together the best of SPOT 3 and 4. Y'all can do the same thing.

CAPCOM Okay, Pete.

CAPCOM Okay, Pete. We're leaning right now towards the traverse for site 4 although we wouldn't take it necessarily the same order it's spelled out there. If you want, you can get out your notes on board for site 4 and we could give you a tentative of the spellout of the order in which you would hit those points. And in looking at it, I see it would take you down to the western wall of the Surveyor crater which is, I believe, the way you want to go.

INTREPID Yes, let me find No. 4 here. Just a second, I'll be right with you.

INTREPID Say, that ought to work out pretty darn clever. Actually, to start at FZ which is essentially where we landed there.

CAPCOM Roger, that's affirmative. We show our present thoughts on where you landed are R2 15.0. And, if you like, I'll give you the order in which you could hit those points that are spelled out. Allright A through G.

INTREPID Hey, wait a minute. I'm going to prove your knowledge of where we are. It just came to me what crater I'm looking into here. I am sitting approximately 120 feet northeast from the No. 3 crater, that's 3 in age, that is on the east side of the head crater which would be Q - as a matter of fact, we're right on Q-5 and about 14.1.

CAPCOM Roger, Pete, we copy that. The back room will be thinking about that and we'll get back to you on that. That puts you pretty close.

INTREPID Okay, now give me some words about the water in my boots. I'm not kidding. I've got water in my boots and I want to know what to do about it. I didn't get any water out of my drain hoses but I'm just beginning to pick up water in my left boot. I had it in my right boot for awhile.

CAPCOM Okay, stand by, Pete, we will be right with you.

INTREPID Okay. I tell you. The first thing I am going to do is disconnect the suit hoses.

CAPCOM Okay, we're thinking about that, Pete, and why don't we go on with this debriefing and we'll get back to you as soon as we can come up with a good recommendation.

CAPCOM Pete, can we go ahead with the debriefing? What I'd like to do is give you the recommended order for the points in traverse 4.

INTREPID Okay, just a second. I disconnected my hoses. This blue hose is really pumping out pretty moist air. I'm just going to let it pump it out. The air is ice cold air and

INTREPID I think that's part of the problem.
Is there some way we can warm up this air?
CAPCOM Stand by with that, Pete.
CAPCOM Pete, would you give us the position
of the suit temperature valve and also confirm that the
LCG pump circuit breaker is pulled.
INTREPID Okay. Suit temp is full cold. I
guess we'll go to full hot on that.
CAPCOM Affirmative.
INTREPID And the LCG pump breaker is out.
CAPCOM Roger.
INTREPID Okay, give me your recommended sites
now.

CAPCOM Roger. Okay, No. 1 would be F and
that's head crater, B - bench crater, No. 3 A, sharp crater
and we might possibly delete this depending on how you are
doing on the timeline at that point. No. 4 is C, halo
crater, No. 5 - D, Surveyor, 6 is E - block crater and we
will omit G.

INTREPID Okay, now where is A? Oh, the
sharp crater, is that right?

CAPCOM That's affirm. A is sharp crater.
We may just cut across that corner depending upon how you
are doing on the timeline.

INTREPID Yes, but don't we also want to get
out here on this possible Capernicus ray stuff. Oops,
excuse me, you're Clanton material.

CAPCOM Roger. We do want to get off after
that Capernican ray material. Two points, one is further
out and you might be able to hack it in normal traverse,
for the documented samples. and 2, we're not too sure
exactly where that line really lies. If you can, go on
over to get that - into that area without taking a lot of
time away from the other documented sampling, press on.

INTREPID Okay, in looking at the map, we got
all the way over to - if you go to, what is it, the general
map, Map 5 - whatever you want to call them - we get over
in that shelf crater, that where you sent us and we got to
that fellow so some of that stuff we picked up, might be
of that Capernican ray material

END OF TAPE

INTREPID This stuff we picked up might be of that Copernican ray material. We also had photographs down there of that shelf, which everybody thought was interesting. I took a set of stereos in that thing, all the way around that big crater. Now we made it over there with no strain. Matter of fact, we ran over and ran back in nothing flat. So I think it's reasonable to go as you have indicated. Which would be 1, starting at F, which is right in front of the spacecraft then going to SHARP, then going to BENCH, then to HAILO, then to the Surveyor crater, then to BLOCK and back to the spacecraft. How's that sound?

CAPCOM Roger, Pete. That sounds real good. Understand you'd like to go SHARP and then BENCH.

INTREPID Yeh, we can try that.

CAPCOM Roger, no problem.

CAPCOM Okay, Pete, if you would, take a look at the information you have there on those sites and we'll be getting back to you in the pre-EVA briefing and talk a little bit more about the location of the sampling, the core tubes, and the trench site sampling.

INTREPID Okay.

CAPCOM You may have some pretty good ideas on that now after being able to look at it first hand. And Pete, we have several questions for you related to the EVA. We'd like to move through these pretty quickly, as we know we ought to get you off to bed pretty quickly.

INTREPID Okay.

CAPCOM First a question on the water in the boots. When was the first time you got water in the boots, Pete and Al, do you have any in at the present time?

INTREPID Al doesn't have any. I noticed it just starting before I just got on the suit loop to prep for EVA. I noticed it when I came - it started in my right boot when I came back in and these hoses - blue hose, of course, was up. Pumped out about 3 or 4 3/4 inch balls of water when I first disconnected it, just a few seconds ago.

CAPCOM Roger, thank you, Pete.

CAPCOM Question for you, Al. In the EVA prep the PLSS COM check took longer than nominal. What corrective action did you take and do you think we may have a problem the second time around?

INTREPID Not at all. It was completely my error. At the front of the RCU there's a switch, it goes MAIN, OFF, I pushed it ON or something like that, momentarily did, and we should have had it at MAIN and we didn't. And so we were a little confused there for a while. It was entirely an onboard problem.

INTREPID Question for you Houston. How long was our total EVA prep time?

CAPCOM Standby on that one.

CAPCOM Pete, your total EVA prep time was 2 hours and 8 minutes.

INTREPID Okay, I believe we'll do it about 1 plus 45 tomorrow as planned. Like Al said, one we made a couple of mistakes and the other one we just had our heads up the block. Something we didn't have on the checklist and we should have known better.

CAPCOM Pete, or Al, second question. When you put the core tubes in, do you now think it's feasible to join two core tubes together and perhaps get at least 1-1/2 core tube lengths in. Something in that order?

INTREPID Yeh, it was getting harder as I drove it in. Just like it does back on Earth. But I think if you wanted to stand there and pound, maybe three times as long as you would have to to drive in one, you could do it. I don't know if we could do that now though with those pins in but maybe we could take those pins out and put two of them together. I'd sure be willing to give it a try if you'd want to do it.

CAPCOM Okay, we'll be thinking about that one and get back to you with it. Apparently the ordering is what made the difference there. If you're looking at your map -

INTREPID (garble)

CAPCOM Go ahead.

INTREPID No comment there.

YANKEE CLIPPER (garbled)

CAPCOM Roger. Standby on that Dick.

INTREPID Okay, Houston, if you're watching the computer I'm going to bring it out of standby and put it back in again to update the quad sign.

CAPCOM Roger, Intrepid.

INTREPID There's another one of those DOWN LINK test alarms.

CAPCOM Yankee Clipper, Houston, we're ready for the E mod.

YANKEE CLIPPER (static - garbled)

CAPCOM Roger, Intrepid, copy 36 point 1 volts and would you say which ones those apply to?

YANKEE CLIPPER Say again.

CAPCOM Clipper you gave me a reading 36 point 1 volts. I didn't copy for which batteries were you reading that out.

YANKEE CLIPPER Okay that's three of them on battery C, one on BAT A and one on BAT B.

CAPCOM Roger. And we'll be up to you with an RCS update in a minute.

END OF TAPE

CAPCOM Yankee Clipper, Houston.
YANKEE CLIPPER Go ahead.
CAPCOM Dick for the sleep period in order to get a little extra signal merging on the OMNI's. We would like first of all for you to turn your high gain off, S-band normal, voice to OFF, S-Band auxillary tape to OFF. If you have to call ground, do it on a ground voice backup.
CAPCOM Clipper. Did you copy?
CAPCOM Intrepid. Houston. Would you give us AFT OMNI.
CAPCOM Intrepid. Houston.
INTREPID Go ahead, Houston.
CAPCOM First, would you give us AFT OMNI and we are ready to pick up with the debriefing.
INTREPID S-band - is that what you want?
CAPCOM Negative. That's the VHF antenna.
INTREPID Go, Houston.
CAPCOM Intrepid. We are ready to pick up with the debriefing.
INTREPID Okay, Houston. Go ahead.
CAPCOM Okay. Two questions related to the mounds which you saw out there. Is the object at R5 13.1 a mound or a rock? And secondly, confirm that you did get a sample of the mound material.
INTREPID Yes, we got a sample of the mound material, lots of it, and would you say again the coordinates.
CAPCOM Coordinates are R5 13.1.
INTREPID No, I don't think so, Houston. This mound is too small to show up like that. I believe I'll look at it a little more just for a minute and think about it. The mound - I'll tell you where the mound is - the mound is not seen on the map. What you gave me is a crater.
CAPCOM Roger. We copy that. And on that mound sample, you got material from the mound as well as material around the mound itself.
INTREPID That's right. We can get tomorrows document sample if you want.
CAPCOM We will talk to you about that in the briefing before the EVA, Pete. And a question on the number of sizes of rock - what was the ratio of fines to rocks that you finally ended up with?
INTREPID I put two of the large scoops worth of fill in one bag that has three rather large rocks in it. I think it is three and the other bag of rocks fills half of the rock box and I guess there were - what would you say, Al, ten, twelve, rocks here and the rock box is full to the

INTREPID top. I can't get anything more in there. I'll say that. And get the purge tube in there. That's it.

CAPCOM Roger. WE copy that. One question on the side dust cover. Was the side dust cover well alined after reclosing and the reason for asking that is in case we suspect a misalinement, we would try to activate that now and if it doesn't work, we would have MANUAL backup.

INTREPID The side dust cover popped off about three times, Houston. And the last time it popped off was when we just finished alining it neatly level and we put out the cold cathode I gauge and the cover popped off again and we didn't want to disturb the experiment to try and put the cover back on - we have spent already overtime on it, so we just left the cover off. So as the experiment sets right now, the cover is off. Now if this is not acceptable, I guess we can take a swing by there tomorrow and try to put the cover back on and we can put it on lined up accurately as it was to begin with if that is what you want.

CAPCOM Okay. Stand by on that and I'll message that one tonight.

INTREPID Okay. My recommendation is unless it is going to hurt the side to leave it just like it just like it is because it is just a precariously balanced experiment over there and it is going to take time to do it right.

CAPCOM Roger. WE copy that, Al. And, Pete, could you give us an estimate of the number of rocks that you have onboard?

INTREPID I really didn't get a count, Houston. Well, let me see - I guess it would be about, would you say about 15 to 20 rocks is all.

CAPCOM Okay. We are looking for really the quantity of rocks - pounds of rocks.

INTREPID That rock box is heavy. I'll tell you that. I think it is right up to max.

CAPCOM Roger. That is good enough. One last question, Al. When you took the fuel element out, in the extraction, what was the force profile like - in other words did they all of a sudden come free at one point or did they gradually come free as you extracted it.

ENTRIPID Well Pete started pounding on the side and as it came out, an eight of an inch at a time - make that a sixteenth of an inch at a time - until it was about three-eighths of an inch out. Once it was three-eighths of an inch out, it slid out rather easily.

CAPCOM Roger. We copy that.

INTREPID What is the fuel cans made out of?

CAPCOM That's graphite.

INTREPID Okay, well, I pretty well was beginning to bang it up pretty badly, as a matter of fact, I think I cracked it. I had better go look at it tomorrow and I was rapping it as hard as I could and was getting about an eight- of an inch at a time until I finally got - what would you say Al - an inch and a half out and then it came all the way.

CAPCOM Roger. Pete, no problem with that. You don't have to go back to it.

Intrepid Okay.

CAPCOM Pete. We have a procedure here in order to get the water out of the suit loop. First suit loop - for the suit isolation disconnect both - disconnect the O2 hoses. Suit isolation to suit flow both, lower the outlet of the hose to floor for about 2 minutes. Suit isolation to disconnect both connect both O2 hoses -

END OF TAPE

CAPCOM Suit isolation to disconnect both, connect both 02 hoses, suit isolation suit flow both.

INTREPID Okay, understand. Will do it in a little bit. We're eating right now. My hose is disconnected anyhow.

CAPCOM Roger, Pete. And we don't see a real easy way of getting the water out of the boots, so if you turn the heat way up, we may be able to dry some of it out and the other is to use gravity in whatever way you could use it.

INTREPID I don't have that much water in there and it is drying up. Or, at least it is as warm as I am right now, so it's not bothering me and it's no sweat.

CAPCOM Roger.

INTREPID I just want to make sure the suit is running right. That's all.

CAPCOM Roger, Pete.

INTREPID Say, Houston. Question for you.

CAPCOM Go ahead.

INTREPID Here's a question for you, Houston. With the tape meter being like it is and those erratic readings we seem to be getting approaching of PDI as far as the backup fairless monitor check, how are we going to use that tape meter tomorrow when we try to update the AGS range and range rate?

CAPCOM That's a good question, Al. Well be working on that one. That's another one tomorrow. We are going to have a lot of people -

INTREPID Okay, I think we can call up NOUN 78. Yes, I think we could just call NOUN 78 with P-20 right under it. Isn't that right? You can do that. The first thing I propose doing, Houston, we'll get a - we got a quick airborne check after we launched and I get a manual lock on or something, do a VERB 63 and check the date meter against the DSKY.

CAPCOM Roger.

INTREPID That's no big deal.

CAPCOM Roger, Intrepid. We recommend also that you shoot for the three and one-half hour EVA.

INTREPID Okay.

CAPCOM Roger. We'll wake you up at the nominal time in the flight plan.

INTREPID Okay.

CAPCOM Yankee Clipper, Houston.

CAPCOM Yankee Clipper, Houston.

CAPCOM Yankee Clipper, Houston.

CLIPPER Houston, Clipper, go ahead.

CAPCOM Clipper, you have AC rules listed in the DAP. Would you verify that your AC thrusters are also enabled?

CLIPPER (Inaudible because of static)

CAPCOM Dick, we also have a liftoff block data for rev 20 through 24 when you are ready to copy and your RCS totals, if you are interested.

CLIPPER Yes, I sure am interested in the angles. Just a minute though.

CAPCOM Roger, Dick.

CLIPPER Okay. Go ahead.

CAPCOM Rev 20, T8 1221932, rev 21, T9 1241754, 22, T10, 1261613, rev 23 T11 1281434, rev 24 T12 1301259. Your RCS totals at a GET of 121 plus 30 is 57.7 and ALPHA through DELTA are 60.7 55.5 58.8 56.0.

CLIPPER Roger. Copy. Thank you very much. Is that it for the day?

CAPCOM You're welcome, Clipper. Say again the questions.

CLIPPER Is that for the day?

CAPCOM Again you were broken. Repeat the question.

CLIPPER I guess that's it. Good night, eh?

CAPCOM Roger. That's it, Dick, except for one thing. Would you verify that your pyro bat readings are 36.1 rather than 37.1?

CLIPPER 37 - 37.1.

CAPCOM Copy. 37.1. Thank you. We'll talk to you in the morning.

CLIPPER Okay.

PAO This is Apollo Control at 121 hours, 59 minutes and in Mission Control, we are changing shifts at this time. Flight Director Glynn Lunney has taken over from Flight Director Jerry Griffin. Our capsule communicator is astronaut Paul Weitz. Our change of shift press conference will begin shortly in the Houston news conference. The participants are leaving Mission Control at this time. At 121 hours, 60 minutes, 122 hours, rather, this is Mission Control, Houston.

END OF TAPE

CAPCOM On your - did you have any problems with the tape meters on your descent other than as reading high on the perilune check?

INTREPID We had an altitude altitude rate on the decent naturally. It looked to me like it agreed pretty closely with the PGNS the perilune readout on the DSKY.

INTREPID That's what kind of concerns me about the rendezvous radar. Also that low pressure (garble). Maybe it all hooked in somehow.

CAPCOM Okay. Thank you.

INTREPID No. I don't. I disagree. I disagree on low transmitter power out here. We got a - we got surface watch UP and when the Command Module went by to give P22, the tape meter did not monitor the P22 like it does in simulators. I'll say that for it. And secondly, it rides off - I don't remember the number now, but it was off when the thermal reading self test although the A portion of rendezvous radar self test was absolutely correct. So I suspect that there may be just on an occasion. Now don't think there's anything wrong with the rendezvous radar itself.

CAPCOM Okay. Thank you. And it was just - it was not in agreement. There was not erratic in operating it anyway, was it?

INTREPID No. It runs just perfect. Not erratic. I think it's just my impression of these perilune altitude checks I think. It may be a bias on it like 30 or 40 feet per second.

CAPCOM Roger Intrepid. Thank you.

CAPCOM Intrepid, Houston. Pete, the second time you disconnected your suit hoses, did you get any water out of the hoses then?

INTREPID No. It was the second time that I got all the water out of them. I took them off the first side and put them on the floor as you advertised and didn't get any water out of them. I put them back on again, I started getting water in my boots, so I took them off that time and I never put them on the (garble). I took them off and blew 3, 3/4 inch water balls right out of it - splattered all over the spacecraft and since then its been pretty good. And we turned the suit loop a little hot and we'll see how that works.

CAPCOM Okay. Thank you.

CAPCOM Intrepid, Houston. Has Al done the same thing with his hoses Pete and if he has not we would

CAPCOM -like to request that he do so before you turn in.

INTREPID Yes. He hasn't got any water but he's going to drain them right now. Got it down here for an hour to eat tomorrow. We're in 1/6th g and where it doesn't take us anywhere near that long to eat, we can whistle through things a lot faster. I think we can pretty well fix a nominal timeline and get a good nights rest. It may turn out, that after 6 or 7 hours worth of sleep, we're going to get stirring because we're both up and we're not going to sit here. So, we'll give you a holler whenever we get up. And we're going to start cooking right then and there and be ready to go over the still after that so we can get a good EVA out of it as possible and not cut ourselves at the end.

CAPCOM Okay. That will be fine Pete.

CAPCOM Intrepid, Houston. I request that Al go to suit flow while your disconnected so if there is any water in there it will blow it on out.

INTREPID That's a pretty reasonable request.

INTREPID Go ahead.

CAPCOM Okay Pete. Can I have the results of Al's suit loop check?

INTREPID Roger. He got 2 drops of water. That's it.

CAPCOM Okay, understand. And on that lithium light -

INTREPID I (garble) Paul. I don't have any water at times to speak of. Pete does. His is coming out all the time.

INTREPID We'll switch the hoses.

INTREPID Ah separator - but I really don't think that's a gasket. (Garble).

CAPCOM Roger Al. Understand. And also on the lithium hydroxide canister change. If it fits in with your activity at that time, we would like to have it changed out at 130 hours on the clock and for your information, your 12 minutes past the halfway mark in your total mission time.

INTREPID Roger. And you want the LiOH at 130 00.

CAPCOM That's affirmative.

CAPCOM Intrepid, Houston. Let us know when you're getting ready to turn in Pete and we won't bother you anymore.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 1319, GET 122:57 344/4

INTREPID Okay. We're still fiddling around here a little bit. We're just getting ready to lay the hammocks now.

CAPCOM Roger.

INTREPID Al wanted to go EVA again and I refrained him for tomorrow.

CAPCOM Okay. Good show.

INTREPID Houston. Do you want us to go with - go to (garble) present.

INTREPID Backup is OUT. Amplifier OFF.

CAPCOM Stand by you guys, Intrepid.

CAPCOM Intrepid, Houston. It's affirmative Pete.

INTREPID Okay. We'll go DAP backup and power amplifier off at this time and configured for sleep.

CAPCOM Roger Pete. Nighty, night.

INTREPID Would a - Okay and understand it's 129 55 is reville. Is that right?

CAPCOM That's about it.

INTREPID Okay. We'll leave it on that. Nighty, night.

PAO This is Apollo Control. That brings us up to date with the taped conversation and we'll continue to stand by live now. We have about 24 minutes until re-acquiring Dick Gordon in the Command Module and it's been about 30 minutes since we said goodnight to the crew of Intrepid on the lunar surface. During that taped conversation you heard Pete Conrad advise that he felt they would have no trouble staying with the EVA timeline for the 2nd EVA. He also gave a clear implication that if the crew is up and awake somewhat earlier than the scheduled wake up time of 129 hours 55 minutes, that they would plan to press ahead with the EVA implying of course that we could have it somewhat early extravehicular activity. However, we won't have any further information on that until we see what time the crew gets up after their sleep period and until we see how well they're staying with the timeline in preparing for the EVA. At 123 hours, 9 minutes this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 1349, GET 123:27 345/1

ALL DEAD AIR

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69 14:19 PM CST GET:123:57:00 346/1

PAO This is Apollo Control at 124 hours, 1 minute. It has been about 1 and 1/2 hours since we said goodnight to the crew of Intrepid, Commander Pete Conrad and Lunar Module Pilot, Al Bean, and it has been about 2 hours since we last heard from Dick Gordon aboard Yankee Clipper. At Mission Control we have monitoring systems on both spacecrafts. Everything continues to look normal. Flight Director Glynn Lunney has been reviewing the status of the extravehicular mobility unit for the upcoming second EVA. We'll continue to leave the air to ground circuits up live should we have any conversation from the spacecraft. The scheduled wakeup time is 129 hours, 55 minutes. Pete Conrad advised before beginning the rest period that if he and Al Bean were to awake earlier than the scheduled wakeup time, they would expect to get up and get going working toward their EVA. At 124 hours, 2 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 1449, GET 124:27 347/1

ALL DEAD AIR

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 1519, GET 124:57 348/1

PAO This is Apollo Control at 125 hours, 3 minutes. The sleep period is scheduled to end about 5 hours from now. The Command Module, Yankee Clipper has been behind the Moon now for some 20 minutes. We're scheduled to reacquire in about 26 minutes from now. The last look we had at the Command Service Module, before it went behind the Moon, everything looked good. We last heard from Dick Gordon, aboard the spacecraft, at about 122 hours at which time he advised that he was beginning his rest period. And we last heard from Pete Conrad and Al Bean aboard Intrepid at 122 hours, 37 minutes. Scheduled to wake up at 129 hours, 55 minutes. We'll continue to leave the air to ground circuits open throughout this sleep period should we get any conversation from the crew. In Mission Control it has settled down to a very quiet period now. We've completed reviews of the portable life support systems status and activity now is involved primarily with keeping an eye on the spacecraft's systems. At 125 hours, 5 minutes this is Apollo Control Houston.

END OF TAPE

Intrepid Okay, Houston. We both slept 5 hours.
My PRD is 11020 and Al's is 04021.

CAPCOM Roger. Copy, Intrepid. For information,
Pete, can you see the ALSEP out the LM window?

Intrepid Sure can.

CAPCOM Okay, Al. When you get a chance, what
I would like for you to do is - they are not getting the
readings they expected from the CCIG. If you can, we would
like you to give a "look see" at it with the monocular to
see whether you can tell whether it is right-side up and
whether the port has been opened or not. Over.

CAPCOM Okay. Wait one. We left that in a
rather precarious position due to the cable last night and
it wouldn't surprise me if it is not upside down, face down,
because that is exactly where it wanted to go.

CAPCOM Understand, Pete. It's been given a
command to open the ports and the pressure has not gone down
in it at the rate they expected.

INTREPID When we left it last night, Houston, we
left it sorta on its back facing about 80 degrees from the
horizontal. That was the best we could do.

CAPCOM Okay. Understand.

INTREPID Uncertainly Houston, it is on the
opposite side of the side and it it was suppose to line up -
it does look like (garble)

CAPCOM Okay. Thank you Pete.

CAPCOM Intrepid, Houston. I have got weight
change for you that came in a couple of hours ago. On the
rocks you are bringing back in the jettison bag, Grumman has
come through along the way and several people have decided
that the weight, the allowable weight, to be stowed in the
bags on the deck there, should be reduced from 35 pounds to
20 pounds. That's 14 pounds of rock and one 6-pound bag.

INTREPID I didn't quite get the end of that.
Say again.

CAPCOM Okay. Stand by one, Pete.

INTREPID Houston. While you are working that
problem, I would like to know if there are any restrictions
on when we go over the sill.

CAPCOM Okay. Stand by Pete and we will give
you a word on that.

INTREPID Okay. I would like to go as soon as
I can get ready without hurrying. I have kinda got the

suspicion looking over the prep card - a good bit of this stuff is done - and it is pretty much a deal of hooking up the PLSS's and going and I think we are going to be able to get out somewhere around 13130 to 132, and we will be looking at the time line and see what we should be doing then normally.

CAPCOM Roger, Intrepid.

CAPCOM Okay, Intrepid, Houston. That's affirmative, Pete, whenever you're ready, at your own pace, you can go over the sill. Of course we do want to talk to you about the briefing on the traverse before you go out.

INTREPID Okay. I will give you a call in about 3 or 4 minutes. We have some sprucing up to do and while we are eating breakfast you can give us the hot word on geology. Also give us some word on the families, if you would.

CAPCOM Okay, sure will. Did you get that on the allowable weight of the materials to be brought back in the jettison bags being changed from 35 pounds to 20 pounds.

INTREPID Roger. How far down the CL is this. I can't remember.

CAPCOM It's 1 inch, Pete.

INTREPID 1 inch, Roger.

CAPCOM Intrepid, Houston. They want your TV camera brought back so I have got some changes to your surface check list to cover stowing it for return when you are ready to copy.

INTREPID Okay. Wait one. What page?

CAPCOM Okay. Page 65 to start with.

INTREPID Go ahead.

CAPCOM Okay. Down under the block that contains the rest periods - about the fifth - fourth item down is voice-to-voice. WE want to insert in there a step to stow utility towels from the hammocks in the upper boot box. These will be used, as I will describe to you later, to protect the TV camera when you stow it for return.

INTREPID Shucks. We already took them out to use to keep ourselves nice and clean.

CAPCOM Okay. Okay. Now on page 67 of the surface checklist.

INTREPID Go.

CAPCOM Okay. On the right-hand column under EVA 2 prep about the eight or ninth line down it says remove ECS lithium hydroxide cartridge and bracket. Do not remove the bracket.

END OF TAPE

CAPCOM Okay, on the right hand column under EVA 2 prep about the 8th or 9th line down it says remove ECS lithium hydroxide cartridge and bracket. Do not remove the bracket. Keep it on the engine cover. Over.

INTREPID Good idea.

CAPCOM Okay, now on page 77.

INTREPID Go.

CAPCOM Okay, on the right hand column under LMP next to the last step after VERIFY CIRCUIT BREAKER, insert a step to open the TV circuit breaker.

INTREPID Okay, Houston. In other words, you say to turn the TV on to begin with and then before I get out to open. Is that the plan?

CAPCOM That's affirmative, Al. I should have made that clear. They want to try one more (garbled) to see if something short of a miracle occurred and then you will open the circuit breaker again before you get out.

INTREPID Sounds good. Be sure to remind me because it's not on my current checklist and I won't have this one out. And what's the latest (garbled)

CAPCOM You mean on why it didn't work, Al?

INTREPID That's right.

CAPCOM That hasn't been resolved yet.

INTREPID Well, I'm going to worry about that one all night.

CAPCOM Okay, don't sweat it. On page 78 now.

INTREPID Go.

CAPCOM Okay, under the CDR now we're going to have you use your Surveyor dismantling tool I guess on this TV camera, the cutters, to get it apart. So add a couple of steps here, pete, at the end of your list. We want you to cut the TV cable on the spacecraft side of the camera connector, below the adapter. And then stow the TV -

INTREPID Yeh, I understand.

CAPCOM And then stow the TV camera in the ETV.

INTREPID Okay.

CAPCOM We'll remind you of these steps since they're not on your chart.

INTREPID (garbled)

INTREPID That's like you're not on the Gulf.

CAPCOM Roger.

INTREPID Okay go ahead, Paul.

CAPCOM Okay, now on page 93.

INTREPID Go ahead.

CAPCOM Okay in the right hand column, the 4th or 5th line up. After unstow 70 mm cameras, add a step to unstow the TV camera from the ETB and stow on the engine cover.

INTREPID Okay. Next step.

CAPCOM Okay, it's been written on page 97, Pete.

INTREPID Go ahead.

CAPCOM Okay, let me read it over here a minute and I'll paraphrase it for you. We want to fold the TV camera We're going to stow it in the lithium hydroxide cannister.

INTREPID Okay. Do you want us to pack it with the towels as best we can, huh?

CAPCOM That's affirmative and they want it - just wrap the remaining - fold the handle, wrap the cable around the camera as best you can and stow it in the lithium hydroxide cannister bracket on the engine cover and stow it with the lens up. Over.

INTREPID Okay, now has anybody checked to make sure that we can fit the camera and all the cables and stuff in that -

CAPCOM That's affirmative they had and - oop - Okay -

INTREPID Okay the only reason I wondered is in case it - we'll make it work.

CAPCOM Roger. The lens will stick up - it's been checked out - the lens will protrude up out of the cannister stowage about 6 - 7 inches and they then want you to wrap some utility straps around the end of the camera to hold it in place.

INTREPID Will do it. Consider it done, (garbled)

CAPCOM Okay. And one other thing, on your tie down of this bag with the extra rocks in it, they want you to run an additional strap - standby one.

CAPCOM Okay, after you get the bag secured on the deck there between you, they want an additional strap run from the straps holding the bag down up to the ISA D ring, for additional support. Over.

INTREPID Okay, we'll do it.

CAPCOM Okay, that takes care of our procedural changes this morning and I'll give your families a call and get the word back up to you in about 5 or 10 minutes.

INTREPID Sounds good. What's the Yankee Clipper doing, sleeping?

CAPCOM Yeh, he's cutting off a few Z's there. Clipper's scheduled to sleep til 130:130 and our intention now is to let him sleep til then, if he does.

INTREPID Okay.

CAPCOM Okay, I got a couple of messages for you here I'll read up to you. . The officers and crew of the USS Independent - or correction of the USS Intrepid send their best wishes to all three of you. They're following your progress closely as you write another intrepid chapter in American history. And they - from the blue Carribbean, they wish you smooth sailing on your voyage across the vast ocean of space and their thoughts and prayers are with you.

INTREPID Thank you.

INTREPID Say, Houston. Intrepid. I'm going to break the computer data P06 and put it back to bed again.

CAPCOM Standby.

INTREPID Okay, Houston. I've got another one of those 1105 alarms which is uplink too fast. I don't know why that happens all the time, but it does. I'm going to go ahead and put it back to sleep again.

CAPCOM That's fine, Pete.

INTREPID Okay. It's back and standby.

CAPCOM Roger.

PAO This is Apollo Control at 129 hours 31 minutes.

CAPCOM I have a consumables update for you, if you want it, Pete, and after that, I've got some lift off block data.

INTREPID Okay. Go ahead with the consumables update, and then the block data.

CAPCOM All right. RCS ALPHA is 80 percent. BRAVO is 76. Oxygen is 76 and 96. Water 47 and 99, and your AMP R's is 850 and 572. The lift off block data for rev 25 which is T-13, is 132 11 35. Rev 26 T-14 is 134 09 59. Rev 27 T-15, 136 08 25. Rev 28 T-16 is 138 06 50. Over.

INTREPID Roger, Houston. We copy. The consumables updates and your lift off time is 132 11 35. 134 09 59, 136 08 25, 138 06 50.

CAPCOM That's affirmative, Al.

CAPCOM Hello, Intrepid, Houston. I have a couple of words on your rendezvous self-test on your tape meter, if you're interested in them now.

INTREPID Go. Up.

CAPCOM Okay, your rendezvous radar self-test was good. The checklist had the spec values, not the actual values, which is the reason for the difference. They ran through them on the ground and it checked out 40. Your tape meter paralune checks were also good. M PAD ran a solution through on the ground here using the actual CSM state vectors. They had been slightly perturbed and they came up with the same values off the chart as you did.

INTREPID Fantastic.

CAPCOM How about that?

INTREPID Okay, then you think our tape meter is going to be accurate during the rendezvous. Then we can just use that data.

CAPCOM That's affirmative.

END OF TAPE

INTREPID Okay, Houston, how about giving me
the word on geology now.
CAPCOM They'll be with you in a minute, Pete.
INTREPID Okay.
CAPCOM Pete, now Houston. We're ready to go
with the traverse plan.
INTREPID Ho, ho, ho, good morning.
CAPCOM Good morning, good morning. We can
pick it up at LSE76G. I think that is the easiest way to
follow it on your map.
INTREPID I have it right in my hand. GO.
CAPCOM Okay, first of all, the two prime
sites we consider around here are Bench and Sharp craters.
We could pretty much follow the traverse which we discussed
before. What I'd like to do is give you the additional
information that you don't have on your sheet and also perhaps
to discuss how we'll fit the ALSEP revisit into this. Your
first point along the traverse is Head crater and which we
called out F. What we would like to do in view of the fact
that you are going out towards the ALSEP is to move that
site over to the northwest rim of Head crater and coordinants
there are R-0-11.0 and then you will carry out which we
already have outlined for Head crater. That's the two
partial pans across Head Crater and document the slope.
slumps and ledges. In addition to that, seeing as we have
the PSE so closely located to that, we would like to see if
we can get a known signal for the PSE so, if possible, could
you roll a large crater - a large boulder - the former would
have been a little harder - roll a large rock into the crater
and take a stereo pair of the rock rolling -
INTREPID (Inaudible)
CAPCOM Take a stereo pair of the rock
prior to rolling and a stereo pair of the track made by the
rock after rolling. Okay, that's point 1, do you copy?
INTREPID Yes sir, we'll rock and roll. We've
had a lot of training for that sort of thing on the geology
trips we had. We're with you all the way. Let's press on
from the head.
CAPCOM Roger. We've got some happy looking
geologists here. We have UEL Clanton back here and he's
betting that somewhere along the traverse, you'll find some
stuff.
INTREPID There's stuff all over the place.
CAPCOM Okay, after this first point, then
you can go on out to ALSEP and word on the CCIG is to make
sure that it is laying on its back. We first would like you

CAPCOM to confirm, however, that you did
try to lay it down in the normal mode and that the only way
you really thought you could make it work is having it lay
on its back.

END OF TAPE

CAPCOM We would like for you to confirm, however, that you did try to lay it down in the normal mode and that the only way you really can - you thought you could make it work - is having it lay on its back.

INTREPID Look, we are going to go the other way around, I think. Let's go to ALSEP and then to 1.

CAPCOM Okay. (Garble) okay. Fine. Either way you want it. Look at the geometry.

INTREPID Another thing while you are standing there - I want to tell you I do I do have Bench crater in view from the window. Sharp crater, I do not. So it looks to me like it would be relatively easy to go to ALSEP to the coordinantes you gave me on Head Crater and I am looking at it right now and I see several rocks which might do what you want to do - which we might be able to roll down the side of that crater and followed by one astronaut, probably, but anyhow we will give it a whirl and then in the next plain you want us to go Sharp, and if so (garble)

CAPCOM No, Pete. The next one is Bench Crater and then we will be moving on to Sharp.

INTREPID Okay.

CAPCOM What we would like to do is to move -

INTREPID Do it the other way around and that way I am going around in a circle.

CAPCOM Okay. What we wanted to do was to move your point B on Bench Crater on over to the northwest edge of it as opposed to on the southwestern edge.

INTREPID Okay. I am with you. Give me the coordinates and we will do it your way.

CAPCOM Okay. Coordinates on that would M zero and ten zero, so you would be up on the north side.

INTREPID Great minds think alike. That is where I was pointing.

CAPCOM Roger. Okay three things we would like you to do which are in addition to what we already discussed on your plan. Take stereo pairs of features of interest in Bench Crater especially of the bench. Determine whether the bench is bedrock or breccia near near the base of Regolith. And if the bench is bedrock, sample ejector representative of the bench or sample the bench itself, if possible. And lastly, look northwest and -

INTREPID I understand.

CAPCOM Roger, Al. And lastly in Bench Crater, look northwest and southwest from the rim of Bench Crater to see if Copernicum ray material is obviously different from

CAPCOM other units.

Intrepid Okay.

CAPCOM Okay. Moving out to Sharp Crater which is coordinate A. First we call for a full trench site sample in the crest of Sharp Crater and we want to make sure you also add to that the gas analysis sample. That looks as though it will be pretty much your furthest point out. We would like a whole pan from the rim of Sharp Crater, that also is because that is your furthest point out. And crew option at this point - extend your traverse west into what appears to be Copernicus ray material and also -

INTREPID Hold on for a second, Houston.

CAPCOM Okay.

INTREPID Okay, Houston.

CAPCOM Okay. Last point on Sharp Crater is sample and describe differences across the contact of M 1, M2, if it is apparent when you reach that region. On your map that shows up as a dotted line running northwest/southeast.

INTREPID Yeah, we have got it. I can tell you right now it is going to be pretty darn hard to do that. You look across under - the materials look all the same. Looking downfront, it looks all the same except it is a different color.

CAPCOM Roger.

INTREPID It is really weird. I am sure you can see the stuff from far out but -

CAPCOM Okay. Last Point.

CAPCOM Okay.

END OF TAPE

INTREPID it's all the same only a different color.

CAPCOM Roger.

INTREPID I don't know if you are aware or not, I'm sure that you can see the stuff from far out, but down here it might as well all be the same until you get right up on top of a individual rock.

CAPCOM Roger. I understand. You might not see any color differences, but if you could keep your eye open for differences in rock types. Movionto the 4th -

INTREPID We will.

CAPCOM Point, which is Halo crater. Now, as we have a call out there, at this point you can try to join the two core tubes together and core through the thin ejecta of crater 6 or Halo crater. When you do that, you'll have to pull the pit pin off the one-core tube which you make the bottom tube. We'd like you to avoid the rockiest parts of the crater, and, if the tubes can't be joined, just take one on the rim and then one about 100 feet west of that location. If you could, give us a pan at that location and here is a comment which is really applicable to all of the traverse. Document pattern ground and fillits on different slopes and blocks, especially any A-symmetric fillits you may run into. We would expect - well, we would find it most interesting to get this type of information on the youngest material so that's why we call for it here, especially in Halo crater. The best way to document pattern ground is to photo into the sun near field and that way the pattern should show up in an optimum way.

INTREPID Okay.

CAPCOM And the last one is you go on down the Surveyor crater and in there we have a Block crater. We'd like there to collect samples of major rock types and a partial pan across the Surveyor crater and I think that covers it from our angle.

INTREPID Okay. We may have a little trouble getting to Block crater. I'm not sure whether it is an optical illusion or what, but that face of that wall that the Surveyor is on looks one whale of a lot deeper than 14 degrees. Now, it just may be that we are standing on the other side of the crater ourselves and it just looks a little funny. We've been discussing the Surveyor a little bit here during the evening, and that crater gets pretty rugged over on that side, especially at the Block area, as I remember it from yesterday. We'll give her a go. Now, when we get in each one of these places, you can remind us of it again. I think we have it fairly well in mind what you want.

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 1294600, CST 2008 360/2

CAPCOM Okay, we'll be talking to you on the way and one last note of clarification on that CCIG. If it's sitting up so that it's pointing horizontal to the ground, just leave it alone. If it's flipped over so that it is looking into the ground, then we want you to lay it on its back. If it's already on its back, that's good enough.

INTREPID Okay. And the covers should be off, is that right?

CAPCOM That's affirmative.

INTREPID If it's not off, should we try and take it off for you?

CAPCOM Stand by.

CAPCOM Pete, that's negative. If it's on there, leave it as it is.

INTREPID Understand.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 129:51:00, CST 2013, 361/1

PAO This is Apollo Control at 129 hours 52 minutes. We're presently in the midst of a shift change in Mission Control. Flight Director Jerry Griffin coming on to replace Flight Director Glynn Lunney. The Capsule Communicator on this shift will be Astronaut Ed Gibson. We plan to have a change of shift briefing at approximately 8:30 central standard time in the Houston News Center. We have reacquired the command module, Yankee Clipper. We have about 46 minutes remaining before we lose contact with the command module, and we plan to continue to allow Dick Gordon to sleep. Pete Conrad advised that the crew will press ahead with preparations for their extra vehicular activity. Beginning that activity as early as 131:30 ground elapsed time or actually between 131:30 and 132. This would be anywhere from an hour and a half or from an hour to an hour and a half ahead of schedule. We will also be turning on the television. The crew has been instructed to turn the television on. To see if there has been any unexpected change in the status and if there is a possibility of getting television picture. If we do not get T.V. picture, the crew has been instructed to turn the circuit breaker off, and they will then, during part of their EVA, clip the cables on the camera and bring it back with them. At 129 hours 54 minutes, this is Apollo Control.

INTREPID Houston, one question. Do you want a core tube at Head crater or do you want us to skip that one?

CAPCOM Standby. Okay, Al, lets look for that third core tube over at Sharp crater. The - take that in the - in doing your trench site sampling. That will allow you to get that biological core tube sample at that point.

INTREPID Understand.

END OF TAPE

CAPCOM Intrepid, Houston. We're having a changeover of shifts here and we may be off the line for a short while.

INTREPID Thank you Houston. That's a good way to do it.

CAPCOM It'll be in about another 3 minutes we're handing over.

INTREPID Houston, Intrepid.

CAPCOM Intrepid, Houston. Go ahead.

INTREPID We were interested to think what has happened to that solar wind collector. It's been sitting out there since yesterday of course and when I left it yesterday, it was just a flat sheet of foil, you know restrained at both ends but as I look out there now, starting about 1 near maybe a foot from the top, it's sort of folded back around the pole that's holding it. Looks almost like a sail in the wind around the pole. It's sort of bulging in the front and bent back on the sides. Real crazy.

CAPCOM We've got a real solar wind, I suspect Al.

INTREPID All right. Now you may think your kidding, I don't know.

CAPCOM No Al. I won't think you'd be kidding. It could be maybe the front part of that is just thermally just expanding a lot more than the back. The backs probably just radiating and the front's probably very hot. And just a thermal difference across could do it.

CAPCOM I'm meeting with a lot of approval back here on that idea.

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/19/69,GET 130:11:00,CST 2033,363/1

CAPCOM - difference across the conduit. I'm meeting with a lot of approval back here on that idea.

INTREPID Naturally. (garbled) Yes, well, it looks like it's wrapped around the pole, and that's a funny thing. It looks like the wind is blowing on it.

CAPCOM Well, we've got two good ideas so far. Maybe we can come up with a third.

PAO This is Apollo Control at 130 hours 26 minutes. The participants in the change of shift news conference have left the Mission Control center and are in route to the Houston News Center where the news conference will begin shortly.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 20:49 GET 130:27 364/1

INTREPID Houston, Intrepid.

CAPCOM Intrepid, Houston, go ahead.

INTREPID Roger. The Li OH cannister was changed out at 130 0000 EVA prep is almost complete to foot donning. We're just putting the stuff on our visors.

CAPCOM Roger, Pete, we copy.

INTREPID Excuse me, material.

CAPCOM Copy.

PAO This is Apollo Control at 130 hours 35 minutes. The news conference is ready to begin and we'll take down the release line during the conference.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 20:55 GET 130:33 365/1

INTREPID Houston, Intrepid.
CAPCOM Intrepid, Houston, go ahead.
INTREPID The LiOH cannister was changed out at
130 0000, EVA prep is almost complete to foot donning.
We're just putting the stuff on our visors.
CAPCOM Roger, Pete, we copy.
INTREPID Excuse me, material.
CAPCOM Copy.
CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Will you confirm that you did keep the bracket
on the engine cover for TV camera stowage rather than
putting it in a jettison bag that is the ECS LiOH.
INTREPID You better believe it, it's still there.
CAPCOM Roger.
INTREPID Thanks very much, CAPCOM.
INTREPID Hey, I got a rough eyeball figure here for
crew shadow length of around 20 feet, that is assuming a
6 foot crewman.
CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Intrepid, one additional word on the CCIG
when you're go out to CCIG, we will leave the power ON
to the instruments and we'd like you to tell us what it's
status is before you touch it. If the status is - such
that we want it left in that configuration, you'll just have
to move on. If you have to change it's configuration, then
we'll have to turn the power OFF and we'd like you to hold
off going near it until we give you the clearance. We'll
give you a reminder of this when you're on the way out.
INTREPID Understand.
CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Pete, Jane's aunt sends her congratulations
and - for a job well done. All of them are thrilled that
you've really made it on the money. The children are fine,
tired but happy and they're going to continue following all
the way through the second EVA.
INTREPID (garbled)
INTREPID Roger, thank you.
INTREPID Houston, Intrepid. We'll be coming upon the
PLSS COM in about 3 minutes.
CAPCOM Roger, Intrepid. We're standing by.
INTREPID We're at the first COM check if you want to
follow it.
CAPCOM Roger. We're with you.
INTREPID Houston, Intrepid.
CAPCOM Intrepid, Houston, we read you loud and clear.

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 20:55 GET 130:33 365/2

INTREPID Roger. I just went to FM and TV and was
unable to contact you. Had you all switched over to FM.
Over.
CAPCOM Standby on that, Al.
CAPCOM Intrepid, Houston. We're configured for the
FM, let's give it another go.
INTREPID Coming at you.

END OF TAPE

PAO This is Apollo Control at 130 hours 57 minutes. There was very little conversation during the News Conference. We'll turn those tapes over to the transcript operation. Pete Conrad has just come up and advised that they will be starting the portable life support system communications checks in 2 to 3 minutes. They are at that point in there pre-EVA preparations. We have advised the crew that when they get to the cold cathode ion gauge that the ALSEP that we will advise them as to whether to touch it or not. We're going to leave the power on that and have them tell us what status that instrument is in. And if there is a need to touch it, we will turn the power off from the ground and advise them when they can touch it. And the CAPCOM, Ed Gibson sent brief messages to Pete Conrad and Al Bean from their wives. Jane Conrad sent congratulations on a job well done on the first EVA and Sue Bean advised Al that she and the children were tired but happy and that both wives were looking forward to following the second EVA. We'll come up now alive again and monitor.

CAPCOM Intrepid, Houston. We're configured for the FM. Let's give it another GO.

INTREPID Intrepid answered.

CAPCOM The Yankee Clipper is behind the Moon and Dick Gordon - -

CAPCOM Intrepid, Houston.

INTREPID Okay. How do you read.

CAPCOM We read you loud and clear.

INTREPID Okay. We've got the TV going right

now.

CAPCOM Roger.

PAO Dick Gordon has 30 minutes remaining in his sleep period.

INTREPID VHF A transmit and receive. B receive.

INTREPID LFBS band TR; ICSTR - relay on. Mode VOX.

INTREPID VHF A transmit receive.

INTREPID VHF B receive. Here comes your COMM. VHF voice ON OFF ON OFF I. Main job recess. BATS A and B noise threshold plus 1 and 1/2; recorder ON; VHF antenna to EVA; Uplink squelch enable; LMP connect the flip COMM Audio TV.

PAO That picture is coming in now. It does not look to be much of any improved.

END OF TAPE

CAPCOM If any improved.
 INTREPID Be in. Buss Mode. LMP to A.
 CAPCOM Okay.
 INTREPID Hello there.
 CAPCOM Read you loud and clear, Pete.
 INTREPID Read you the same. Should have a
 (garble) ON, a vent flag, a p and a press flag.
 CAPCOM Got it.
 INTREPID Press 02 press guage greater than 75.
 CAPCOM It is.
 INTREPID We have a good com check with me. No,
 I understand we don't need that. Commander gone to foot com.
 CAPCOM Okay.
 INTREPID Hold the card.
 CAPCOM NB is OFF. Okay. Press mode commander
 to B. You get no MSFN reception.
 INTREPID Hello there. I read you loud and clear.
 I got a press 0 flag.
 CAPCOM Read you the same.
 INTREPID I have an 02 flag and Ive got 80 percent.
 CAPCOM Okay. Vent flag B, and a press flag 0.
 Here is what I've got. You don't have an 02 to begin with,
 do you?
 INTREPID I have an 02 press in the vent.
 CAPCOM 02 will go out in a minute. Okay?
 INTREPID Yeah.
 CAPCOM Okay. (Garble) greater than 75.
 UP. (Garble). (Garble)
 INTREPID I hear you loud and clear.
 CAPCOM You the same. Okay. (Garble)
 Loud and clear.
 INTREPID Houston, Intrepid. How do you read?
 CAPCOM Intrepid, we read you both loud and
 clear.
 INTREPID Very good. Very good. Okay, Houston,
 LMP's 02 quantity is 80 percent.
 CAPCOM 80 percent copied.
 INTREPID And CDR 80 percent also.
 CAPCOM Roger.
 INTREPID Okay. We are opening the TV circuit
 breaker right now.
 CAPCOM Roger.

INTREPID Final distance set. (Garble)
7 repress closed. Verify.
CONRAD It's closed.
BEAN Delta P opened.
CONRAD It's opened.
BEAN CB11 ECS (garble) opened.
CONRAD Okay.
BEAN Verify ECS caution rates still sep componet
lights on.
CONRAD (Garble)
BEAN Okay. Suit gas converter. Full egress.
CONRAD I'll get it. Okay? Full egress.
BEAN Okay. Cabin gas returned to egress.
Cabin gas returned to egress and verify that the suit circuit
releases is in AUTO.
CONRAD Suit circuit release is in AUTO.
BEAN Okay. Connect to the OPS's.
CONRAD Okay. Second.
BEAN There is your hose. Let me button
your flap.
CONRAD Okay.
BEAN Now, if you will turn the other way,
I will get your other side.
CONRAD Just a second.
CONRAD Okay. Turn to the right. (Garble)
CONRAD Easy does it. That a boy.
BEAN After caution, then ACS sub light and
ECS light. That is the one's we want them.

END OF TAPE

INTREPID Get up there, that a boy. After caution,
an ACO stop light and ECS light, that's the ones we wanted.
INTREPID Yeh.
INTREPID Okay, now let's me get it (garbled) down
here just a little bit.
INTREPID Okay, I can get that to snap. Can't see -
INTREPID Okay, that's all snapped.
INTREPID Okay.
INTREPID All right, do you want to get - oh wait a
minute one other thing right here, there I snapped your
(garbled) hose into the side of your foot there.
INTREPID Okay, did you trim that thing out of there.
INTREPID Yeh.
INTREPID Okay, let me do that to you now.
INTREPID Okay.
INTREPID And we throw in a couple of purge valves
then.
INTREPID Yeh, I got the purge valves right now.
INTREPID Okay.
INTREPID This'll finish you off.
INTREPID Okay.
INTREPID Pete.
INTREPID Yes sir.
INTREPID Got your (garbled) locked.
INTREPID Okay. Let me check you. Your's good.
INTREPID And let me disconnect you from your suit
hoses.
INTREPID Roger, do disconnect.
INTREPID Roger, that's good.
INTREPID This would be easier if you would -
INTREPID Okay (garbled)
INTREPID It's not in. You're going to have to do
that. I can't do it.
INTREPID Okay.
INTREPID (garbled) to yourself.
INTREPID Okay. Get it started and rotate with
(garbled) there you go.
INTREPID That's locked and that's locked, ooh here
let me - that's locked. Locked.
INTREPID Okay.
INTREPID That's it. Hoses under (garbled)
INTREPID Let me check all yours, 1 2, safety's in,
safety's in. That safety's in and that safety's in. They
look good.
INTREPID (garbled)
INTREPID Yeh, Mine in?
INTREPID (garbled)
INTREPID Okay.
INTREPID Okay.

INTREPID - manage 20 close, okay.
INTREPID Position mike.
INTREPID Okay.
INTREPID S-band on.
INTREPID On.
INTREPID (garbled)
INTREPID Don helmets and visors.
INTREPID Okay.
INTREPID This one is yours.
INTREPID Okay.
INTREPID Okey doke.
INTREPID (garbled)
INTREPID That one's locked. That sounded real good.
INTREPID And your helmet is locked. Hold still and
I'll put this on, all right.
INTREPID It's cool in here today.
INTREPID Give you a little chill down with this LCG
INTREPID Okay.
INTREPID Okay. (garbled) off.

END OF TAPE

BEAN We'll go on with this LCG.
 CONRAD Okay. I'm leaving it on.
 BEAN Just a second.
 CONRAD (garbled) let me get it all down in the
 back and everything. Okay, highsters.
 BEAN Okay. You got it.
 CAPCOM Intrepid, Houston.
 INTREPID Go, Houston.
 CAPCOM In looking in the TV the (garbled) will be
 leaving the TV offered us, so if you will take the - keep
 that circuit breaker out and go to S-band mode PM.
 INTREPID Okay. We'll do it in just a minute.
 BEAN Okay, Pete. Prepare to (garbled).
 CONRAD Houston, I'm sure sorry the Tv didn't
 work. It's a beautiful sight to see. Intrepid and Surveyor
 sitting here on this crater.
 CAPCOM Roger, Pete. We'll be waiting for those
 pictures.
 BEAN (garbled)
 CONRAD Okay.
 BEAN Okay. How about that?
 CONRAD Beautiful. Here's a pair of gloves for
 you.
 BEAN D PLSS fan on down here. Roger.
 CONRAD Okay. LCG pump open.
 BEAN Yes. Right now.
 CONRAD Okay. We might as well adjust the TV and
 and S-band be configured. The TV's still out of course.
 BEAN Okay. We're going to PM, Houston.
 CAPCOM Roger.
 BEAN There's PM and - -
 BEAN Disconnect one of the hoses and connect
 plus HsO hose and stow in loader.
 BEAN I'm going to toot around here, Pete.
 CONRAD Okay, and I've got my hoses off. How come
 we don't have our gloves on yet?
 BEAN That's right. Do this first.
 CONRAD Okay. Very good. Can't do the checklist,
 thats all.
 INTREPID Go ahead, get off. Let me get up there.
 INTREPID Okay.
 INTREPID Okay, my PLSS water is hooked up.
 INTREPID Okay, let me turn around.
 INTREPID Okay, and I'm ready to do (garble)
 INTREPID Okay, get yours routed and hand them to me
 and I'll stick them in.
 INTREPID Okay, coming up and over. (garble) and
 release.

INTREPID Okay, now. I've got to get over there against
the hamper. Coming over.
INTREPID I'm not (garble) yet.
INTREPID I don't know. Let me see. You look okay.
INTREPID I can't move in for some reason.
INTREPID Move over my way just a little.
INTREPID Never mind, I'm going to do it with these.
INTREPID All right.
INTREPID You're kind of hung up on the flight data file.
INTREPID This is going to do it better in here. Did
it that way yesterday. Hows it look.
INTREPID Looks good to me.
INTREPID Okay, that's pretty steamy. Here's a pair of
gloves for you.
INTREPID Let me grab that checklist again. Okay.
INTREPID Try to follow it, (garble) and adjuster.
INTREPID Okay.
INTREPID Okay, you're locked and adjusted.
INTREPID Okay, tied on and adjusted.
INTREPID I can see that you are locked. I can see
it.
INTREPID I can see.
INTREPID Okay.
INTREPID Okay, torso tied down. Now it's okay.
INTREPID Okay, that's okay, too.
INTREPID Okay, I'll take connectors.
INTREPID Let me check all yours. You check all mine.
INTREPID On the vertical.

END OF TAPE

BEAN In, lock, water is locked, you got
your water.
CONRAD Water's locked. Everything is locked.
Okay, you look good.
BEAN I've been over these a couple of times on.
Everything -
CONRAD Hey, does that water look good?
BEAN And I checked your water. It's in,
locked. Things are flush.
CONRAD Okay.
BEAN Purge valves are all in. Okay, don EV
gloves and lock them up.
CONRAD Okay, here's a pair for you.
BEAN Thank you.
CONRAD Find it?
BEAN One of mine didn't want to do it either.
Take it off again. Can't tell whether they're in or not. (garbled)
Pete.
CONRAD (garbled)
BEAN Pull this one open.
CONRAD Just a second. Why don't you just let
me have it.
BEAN Okay.
CONRAD There you go. Now go. Push your button
down.
BEAN Okay.
CONRAD Huh?
BEAN Do it this way.
CONRAD Unless the MI hangs up.
BEAN (garbled)
CONRAD I can't do it with (garbled)
BEAN Got them in there?
CONRAD No.
BEAN It never fails, do it? The one thing
we don't want something to hang up it's going to start fogging
up. There you go. Let me look at it.
PAO We have acquisition of Yankee Clipper
now.
BEAN Okay.
CONRAD Everything looks good.
BEAN Do you see that lock? Okay, verify
mine.
CONRAD I can't see it.
BEAN All right, that's locked.
CONRAD It's locked.

END OF TAPE

INTREPID Pressure is at MIN. I'm going to pump on.
INTREPID Verify it's locked.
INTREPID Okay.
INTREPID Then tie this thing.
INTREPID Okay.
INTREPID Locked?
INTREPID Yes sir.
INTREPID Push inverter MIN. Right pumps ON.
I'm beginning to be (garbled). Let's get the cabin to egress, okay?
INTREPID Egress.
INTREPID Can you get them?
INTREPID Egress.
INTREPID (Both speaking together - garble).
INTREPID (Both speaking) Okay, the AG is UP the LHSSC
is unset. It's got PLSS batteries, Li cartridges.
INTREPID On one other?
INTREPID Yeah. Position ETB on engine cover.
INTREPID Where is it?
INTREPID Huh?
INTREPID Bless you.
INTREPID Thank you.
INTREPID Are you GO?
INTREPID Okay.
INTREPID Turn around. Okay. Get back on the engine
cover that way.
INTREPID Don't (garble) I'm going to get my CB (garble).
INTREPID I get my CB's real quick.
INTREPID Roll 1, 1 in. Now 1 out, 3 in. 1 out those
who are in. Fan 1 is in. Cabin, fan one is in. (garble)
INTREPID 2 in, all the way out to preconditioner that's
your add (garble) All out but mission turn.
INTREPID Hey these guards are really good, 3, OUT.
Base that's it.
INTREPID Okay.
INTREPID Same here, they all look good.
INTREPID Ready for a PREP take check.
INTREPID Okay.
INTREPID (garble) 2 on.
INTREPID (Garble). Boy that feels better.
INTREPID Gotta 020 flag, test 0 flag.
INTREPID Pressures coming up good.
GOLDSTONE Goldstone, add.
INTREPID Huh.
CLIPPER Hello, Houston. Yankee Clipper.

CAPCOM Yankee Clipper, Houston. We read you loud and clear. Good morning.

CLIPPER (Garble) charts (garble) things to work (Garble).

CAPCOM Roger, Dick. Your two friends are moving right ahead. They're just about ready to EGRESS. They're running about 1-1/2 hour ahead of time. They're pretty anxious to get up.

CLIPPER Good Houston.

INTREPID I'll make it okay.

CAPCOM Did you turn the optics power off before sleep?

INTREPID Timed to set it at a regulated 3.9 for some reason.

CAPCOM All right, roger.

INTREPID I've got to get my O2 off. You ready?

CLIPPER (garble) turned it back on and woke up.

CAPCOM Roger and Dick (garble)

INTREPID See what that says.

INTREPID Okay let's time it.

INTREPID (garble) we set.

INTREPID Roger I have picked up (garble).

INTREPID Okay.

CAPCOM And Dick, we have a liftoff block data for -

END OF TAPE

CAPCOM And Dick, we have a lift off block data
for REVs 25 through 28 when you're ready to copy.
CLIPPER Go ahead.
CAPCOM Okay, REV 25, P13 1321135 26 P14 1340959,
27 P -
INTREPID Hey, Houston. The decay sets look
pretty good. Are we go for EVA?
CAPCOM Stand by, Intrepid.
CLIPPER - 1380650.
CAPCOM You're GO for EVA, Pete.
INTREPID Okay, I'm going to get my oxygen.
Roger.
INTREPID Okay. What are you going to do?
INTREPID Get my oxygen back on. Okay.
CAPCOM Thank you.
INTREPID Oxygen's back on. Now I got a (garbled).
Now we're on sched.
INTREPID Confirm (garbled). Repress valve
closed.
INTREPID Okay, I'll get it.
INTREPID Okay. (garbled) repress valve closed.
INTREPID Okay.
INTREPID Wait a minute. It's not all the way.
Okay, closed. What else?
INTREPID Okay, I'm going to drop this (garbled)
now for the forward dump down.
INTREPID Excuse me.
INTREPID We're hung up on something.
INTREPID Okay.
INTREPID Got a lot of room.
INTREPID Yes sir.
INTREPID Okay, 4, (garbled) in. There you go.
INTREPID Okay.
INTREPID Okay, 3.5 (garbled) gage did not drop
below 40.
INTREPID Okay, the food loop.
INTREPID It's 41.
INTREPID Mine's 48.
INTREPID My cuff gage is 4.95.
INTREPID Okay, (garbled) at 35? It is?
INTREPID Yep.
INTREPID LM seat circuit 36 to 43?
INTREPID It is.
INTREPID PGA graded at 4.8?
INTREPID That's affirm.
INTREPID Looks good. Go.
INTREPID Start your watch.
INTREPID Okay.
INTREPID Got it started?

INTREPID Yep.
 INTREPID Forward dump valves are open. Dump it.
 INTREPID Coming down, Pete.
 PAO Cabin's coming down. Pressure's coming
 down.
 INTREPID Got something open?
 INTREPID No, that little (garbled) cap popped
 off.
 CAPCOM Clipper, we have a consumables update
 when you're ready to copy.
 INTREPID (garbled) it is 1 pound.
 INTREPID Okay.
 CLIPPER I'm all ready to copy.
 CAPCOM Okay, first Dick, if you would for an
 uplink would you go to P00 and ACCEPT. We'll be giving you
 a CSM state vector -
 INTREPID And I'm 5.0, and the suit loop is 4.0,
 and the cabin is a half, about six tenths.
 INTREPID Okay.
 CAPCOM The pads are yours.
 CLIPPER Roger.
 CAPCOM And on the consumables update at 131
 plus 00 RCS total 57.5, 61.0, 55.8, 57.8, 55.3.
 CAPCOM Everything looks good down here, Pete.
 CAPCOM And your DELTA's from the flight plan.
 First for the RCS -
 INTREPID Roger, looks good up here.
 INTREPID Okay, there goes a H20.
 INTREPID Got one too.
 INTREPID Yep, there it goes. Push to pass.
 INTREPID Okay, cabin is still about 2 and 1/2,
 it's ..25, A1. Just let it bleed for a while.
 INTREPID Okay.
 CAPCOM - 1.3. O2 total 53.9, 57.6. And we
 show that you're 103 pounds below the flight plan. To (garble)
 the cryos would you check the H2 tank 2 heater to the OFF and
 O2 tank 1 heater OFF.
 INTREPID My seat's still 4.9. I'll have to
 giggle it a little bit.
 INTREPID Okay.
 INTREPID Probably still (garbled). Oh, let it
 go for a while. Let it go. Still a little bit more. These
 (garbled) are bleeding down too, see.

END OF TAPE

INTREPID - egress; they just egressed -
INTREPID got to go - yeah - little bit more.
these splits are bending down too; see?
INTREPID Okay.
INTREPID Hold that at point 2.
INTREPID That's got it; 2. That's good enough
Pete. Almost time; okay, you hold her open; all that stuff
will have do her all over - I got it open.
INTREPID Got it?
INTREPID Yeah.
PAO Elapsed time of the EVA clock start
was 131 hours, 29 minutes, 40 seconds.
INTREPID Okay. Now I've got to put this open;
come on over. Dump valve to AUTO. My feed water is ON. Okay,
dump valve back in AUTO.
INTREPID You check; I can't see.
INTREPID Yes sir; it looks in AUTO.
INTREPID Now let's just hold this door open
right here; like that. Do my feed water ON.
INTREPID Okay.
CAPCOM Yankee Clipper, Houston. Are you
copying Intrepid?
INTREPID While we're standing here, why don't
we jettison this gear?
INTREPID If you'll just back into this corner.
INTREPID Just a second Pete. Wait till the
suit pressure goes down a little there.
INTREPID Leave that right where it is.
INTREPID What do you want to do?
INTREPID Close it.
INTREPID All right.
INTREPID System.
INTREPID Stick it in the cracks here -
INTREPID No - stick it in that crack right there.
There's a good -
INTREPID That a boy.
INTREPID Yeah. The hatch aline back - I'm gonna
get this gear in here.
INTREPID All right.
INTREPID Pete; stand there and make sure that
my water is ON all the way.
INTREPID Okay; you'll have to turn.
INTREPID Okay.
INTREPID You're ON.
INTREPID Okay.
INTREPID Turn further than that please.
INTREPID Okay.
INTREPID Wait, wait.
INTREPID That's out there. (laughter)

INTREPID Okay, it's all the way on.
 INTREPID Okay, my water light is out. I have
 a good boiler?
 INTREPID It's out; yeah.
 INTREPID Now. Get this back in here.
 INTREPID Back up; outer water status check is
 okay.
 INTREPID All right.
 INTREPID Get in.
 INTREPID Did you make it?
 INTREPID Nope; sitting on the front porch; just
 looking.
 INTREPID My suit is still pretty high; 4.3; I'm
 writing it up the numeric diff.
 INTREPID Okay, let me turn.
 INTREPID Okay.
 INTREPID Porch with my heel.
 INTREPID Okay.
 INTREPID In?
 INTREPID Wait.
 INTREPID Okay. Tell you what; why don't you
 release my antenna; it's that flop; no, that flop right there.
 INTREPID Flap.
 INTREPID Okay.
 INTREPID I'm pulling mine and when you go down
 to go out I'll take yours up.
 INTREPID Okay.
 INTREPID Up.
 INTREPID All right.
 INTREPID I'm ready to go.
 INTREPID Okay; just a second.
 INTREPID All right. Let me - hold my knee against
 that; that velcro doesn't hold worth a hoot. Okay, out you
 go.
 INTREPID Okay.
 INTREPID Hang on there.
 INTREPID Nope. Okay.
 INTREPID That's the way; you're centered good
 this trip.
 INTREPID That's good. Move a little bit to the
 left. Little bit to the left; there you go. Better get that
 antenna as you go.
 INTREPID Okay.
 INTREPID Out?
 INTREPID Get it?
 INTREPID Yeah, Move a little bit to your right.
 INTREPID Okay.

END OF TAPE

CONRAD Get it?
 BEAN Yes, ready to go.
 CONRAD Okay.
 BEAN Move a little bit to your right, and
 you're out the hatch and I'll be standing by to get the LEC.
 CONRAD Wait a minute. It must be going off.
 Did the bag go on?
 BEAN I can't tell.
 CONRAD I can't either.
 BEAN Okay.
 CONRAD Okay.
 CONRAD Do you want to hand the LEC? I
 mean the - the left hand bag stowage, do you want to get rid
 of it? Get rid of it.
 BEAN All right. (garbled)
 CONRAD Okay.
 CONRAD The circuit. Open the hatch a little
 more and give it a kick, and I'm standing by for the LEC.
 BEAN All right, wait a minute. The LEC
 coming at you. I've got to bring it up. Wait a minute.
 CONRAD Okay, got it.
 BEAN There you go. We'll hand it down the
 ladder.
 CONRAD All right. Now the cameras.
 BEAN Okay.
 CONRAD Woops, long step. Okay, Houston, mark.
 I'm on the lunar surface.
 CAPCOM Roger. Copy, Pete.
 PAO Pete Conrad on the surface at 131:38:58.
 CONRAD One of these contrast charts fell down
 here yesterday, Al, cause there are only 2 good ones. The
 other one is too dirty.
 BEAN All right.
 CONRAD It doesn't rap off, it -
 BEAN Okay, ready to transfer EPB when you
 are.
 CONRAD Okay. Coming right after it right now.
 BEAN Looks like the lock on this PB. We're
 getting a lock on the LEC (garbled) got it jammed with -
 CONRAD Dirt?
 BEAN Dirt, yes.
 PAO The equipment transfer bag has 2 70-mm
 cameras in it.
 BEAN Pull away.
 CONRAD Huh?
 BEAN Pull away.
 CONRAD (garbled) let it out easier. Okay,
 let it go.
 BEAN Just lower it. Lower. All right, just
 lower it some more.

BEAN Hey, hold it right there.
CONRAD Okay. I'll tell you, I'm going to learn -
2 things I'm going to learn to dislike, and one of them is a
TV cable and the other one is the S-band antenna cable.
CAPCOM Roger, Pete, we copy that.
CONRAD They are constantly underfoot.
BEAN All right, now let me take it across -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/19/69, GET 131:42:00, CST 2204, 375/1

INTREPID All right. Now let me take it across to
the other side. Where it's out of your way.
CAPCOM Al, before EGRESS, would you confirm that
the T.V. circuit breaker is out.
INTREPID Confirmed. Out.
CAPCOM Roger.
INTREPID It is out, Houston.
CAPCOM Roger, Al.
INTREPID Okay. (garbled) my friendly snowman. In
face of the activity yesterday, I forgot all about him sitting
here.
INTREPID Pick up you LM. Getting this camera set.
Okay. Got in RC2. Working away here. Let me check on the
circuit breakers, and I'll be out with you.
CONRAD Okay.
CONRAD Still on that side. Do you have enough?
I'll tell you these Teflon bags don't hold up too well in a
vacuum. In a lunar environment. I'll put it that way.
CAPCOM Roger, Pete. We copy that comment. Any
clarification?
CONRAD Yes, they tend to have fatigue failure along
the cracks when you go to open them up. I notice the two bags
that I put in the SRC yesterday are that way. Let me get back
here just a sec. Let's see PS LEAC to be transferred geology
cut stow and HTC contrast charge designator hammers and small
shovel that snowman.
BEAN We have time, Pete.
CONRAD Okay. Have fun. Place SRC 2 on MESA. Attach
weighbag to scale. Attach saddlebag to LMP. There's only
one thing that's bothering me. I don't have that saddlebag.
I wonder why I don't. Might I find one? Aha ha, here's one.
Amie, how are you doing?
BEAN Good.
CONRAD Check. Okay. Keep coming. You're in pretty
good shape. There you go. A little (garbled).
BEAN I'm trying to close the hatch.
CONRAD Oh, okay.

END OF TAPE

CONRAD All right. Now it is stuck. That material around the spacecraft reminds me - in this sun angle - looking into the sun - a very rich brown color - it reminds me of a good plowed field.

CAPCOM Roger. Pete.

CONRAD Looking down sun, it is still the same off ash gray, very light, white, ash gray.

BEAN Okay. LMP. How about let's get a surveyor parts bag here.

CAPCOM - binders.

BEAN Huh?

CAPCOM Pull down those little side binders.

CONRAD They are - Houston. I think that Al and I both find that these little side sun visors are extremely handy.

CAPCOM Roger. Pete. We copy.

PAO The best time we have for Al Bean on the surface is 131:48:44.

CONRAD About the same. Set that line right there, Pete. Say again.

CONRAD Set the tether right there. Okay. Put it on me Pete.

Bean How is that. Do you want me to stand low or high?

CONRAD Low.

BEAN Okay. How is that?

CONRAD Good.

BEAN Okay, got that one on.

Looking good so far.

CONRAD Hey, Al. There is a large size rock.

BEAN It is very difficult to determine a contact around here.

CONRAD Okay. We are putting the parts bag on Pete right now, Houston.

CAPCOM Roger. We copy that.

BEAN Boy, Houston. That com is super. Sounds like you are right inside my helmet.

CAPCOM Roger. That's the same we've had.

CONRAD I wonder what has happened since yesterday.

BEAN I don't know. I think everybody learned

a little -

CONRAD Okay. That bag is on there. Now let's see what else.

BEAN I need to get the tools -

BEAN And before you put the tool in we have to cut a TV cable.

CAPCOM That's affirmative. Cut the TV cable below the adapter - about 1 inch - that is 1 foot below the adapter and stow the TV camera in the ETB.

CONRAD Okay.

CONRAD Hey, look at that surveyor, Al.

BEAN That is not anywhere near as bad a slope.

CONRAD (Garble)

CONRAD Hey look at that Surveyor, Al.
BEAN That's anywhere near as bad a slope.
Now it's out of shade.
CONRAD Houston, That Surveyor looks a lot
better today.
BEAN Yes now that the sun's up it shines.
Very little (garble)
CONRAD Wait a minute. Leave it right on
there for a second. Come on over and put the thing in my
pback and lift down our cameras and then TV. Is that all
right?
BEAN Sounds good.
CONRAD Or either that bring it back - I'm
sorry.
BEAN It's okay. Doesn't make any difference.
CONRAD I think about right here.
CONRAD I think you've got the right idea.
That's the lunar walk.
BEAN Okay. Stick it in here.
CONRAD Look at that part number on the side
of the tool.
BEAN Give that a few turns.
CONRAD Say Houston. While he's putting the
tool on, it's a very interesting thing. There is a anchor
of rock thats literally 6 inches from the engine exhaust
skirt. Its just sitting on the lunar surface and I really
find it hard to believe that the engine exhaust couldn't
blow that rock away. It's only about 3 and 1/2 inches
by 3 and 1/2 inches and its not stuck in the ground; just
sitting there loosely about 6 inches from the engine belt
and of course the ground is glassy clean all the way around
it. Yet the engine exhaust blast didn't blow that rock
away.
BEAN Pete. Where's the saddle bag?
CAPCOM Roger Pete. We copied that comment.
Were you able to get a photo of that in the first EVA?
CONRAD No. We'll get that right now.
CONRAD Is there one in here, Al?
BEAN Yes.
CONRAD Oh.
CAPCOM And Pete, now for your reference on
the photos. Your shadow length now is 18 foot.
CONRAD Okay.
BEAN Here's a couple of sneaky rocks first.
CAPCOM Al also if you would, before you
start that traverse, would you get a good photo of the solar
wind to show us how that foil is wrapped around?

BEAN Will do.
CONRAD Okay Houston, that won't take a second.
BEAN Okay, let me attach this bag to - would
you attach this bag to me, Pete?
CONRAD Yeah.
BEAN I'm going to slide that off one time.
CONRAD All right.
BEAN Okay, I'll tell you what if you go put
one camera against the saddle bags on - if you'd put one
camera on to look at those little - go get the TV, I'll
mount this other gear on here. My compliments to the man
that packed that SRC box. It looks just like training boxes.
CONRAD If you're going to work, hand me those
tongs a second.
BEAN Yes sir. Here's the tongs. Where are
you?
CONRAD Right behind you. Just hold on just a
second. Hold on let's see what this is.
BEAN That's what's left of some of those
parts back there.
CONRAD Okay, got you. Got you.
BEAN Okay. Okay, the core tubes. Come on
get out of there. If I didn't know better I'd say there was
solar wind up here.
CONRAD It blows hard enough to blow sample
bags in the wrong direction. Okay, Al, three core tubes in
the deal. (COMM upcut by VOX unreadable).
BEAN Okay. Take it. Dixie cup dispenser
coming up.
CONRAD Okay.
BEAN Could you (garble).
CONRAD Can I have a bag?

END OF TAPE

INTREPID Saddle bag.
 INTREPID Fits right on its back.
 INTREPID I'm worried about that.
 INTREPID Got it?
 INTREPID Yes, sir. It's in the saddle bag.
 INTREPID Okay. Now here's the other thing
 here, the safety line.
 INTREPID Huh? Oh, yes.
 INTREPID When I hook those on there, too.
 That thing's a pain in the neck over there the way they
 spread out in the vacuum. I've got the gas sample tube here.
 Sample tube coming up.
 INTREPID Now I need to get that safety line.
 INTREPID Okay, I'll put that over here.
 INTREPID Okay, I'll get the safety line.
 One safety line coming up. Excuse me. Okay.
 INTREPID I'll put my camera on and we'll put
 the TV camera in ETB and away we go.
 INTREPID Got it?
 INTREPID Yes, sir.
 INTREPID Did you get your camera out? I'll
 put that TV camera in ETB. Okay?
 INTREPID Okay, from the local terrain, Houston,
 as you know it right now and with the polarizing filter.
 Have you got any particular place in route to the ALSEP
 or to Head crater you would like polarizing pictures taken?
 CAPCOM We'll come back to you on that.
 Press on the nominal plan right now.
 INTREPID Here, let me handle it. (Garble)
 handle it yet. Hold it tight.
 INTREPID I've got it as far as I can.
 CAPCOM Pete, we have no preference on that.
 Go ahead and take it as called out for in the cuff checklist.
 CONRAD Okay. Take an ETB (garble).
 BEAN Good idea.
 CONRAD Candle in.
 BEAN Okay. Drop her.
 CONRAD Okay, Houston, one TV camera in the
 bag and our plan of attack is, Al, one picture of that
 rock in the descent stage.
 BEAN Shall do.
 CONRAD Good. The hand tool carrier and head
 for the solar wind and grab a picture of that and in the
 meantime, I'll lope off to the ALSEP and check the sides.
 I'll meet you at 21 at Head crater.
 CAPCOM Roger, we copy and, Al, have you gotten
 the readings on the contrast charts?

BEAN No. Not yet and I'm trying to do that
real quick.
CAPCOM Roger.
BEAN Houston, Pete's on his way to the ALSEP.
CAPCOM Roger, Al. We copy, and at 30 minutes
into the EVA, you're pretty close to the nominal time line.
BEAN Very good.
CONRAD Can the guy with the seismometer, hear
me running.
BEAN Fix the (garble)
BEAN Gene?
CAPCOM Pete, we're watching you down here on
the seismic data. Looks as though your really thundering
right by it.
CONRAD Yes. I ground to a halt to switch to
intermediate cooling. I noticed that it is obviously a little
bit hotter out here with the higher sun angle now. Okay.
I'm approaching the implement side.
CAPCOM Roger. And we're able to copy your
rest and know that you are moving again.
CONRAD Okay. All right. The status is -
I'm going to get done in a minute. The cover is off and it's
pointed up into the sky at about a 60 degree angle.
CAPCOM Roger. Do not touch it right now,
Pete. Which way is that pointing? Relative to east westable.
CONRAD It is pointed down front.
CAPCOM Roger.
Pete, no need to change the configuration. Let's press on.
CAPCOM We copy. That should stop on the
seismic.
CONRAD Yes. That's the handy dandy LMP.
BEAN (garble) contrast (garble).
CONRAD Oh, okay. Meet you at the head crater
pal.
BEAN Okay. (garble) want that rock. Here is
a dandy extra grapefruit size type goody. There is a
crater with a shadow in it.

INTREPID - extra grapefruit sized goody.
INTREPID Where's a crater with a shadow in it first.
there's one.
INTREPID Okay, Houston, I'm approaching a crater and
now I'm going put the contrast (garbled) in it - one on
each side, one on the sunny side, one on the shadow side.
CAPCOM Roger.
CAPCOM Yankee Clipper, Houston.
INTREPID Okay, here's the one on the sunny side.
INTREPID Man, have I got the grapefruit rock of all
grapefruit rocks. It's gotta come home in the spacecraft,
it'll never fit in the rock box.
INTREPID Okay, Houston, I'm going to tell what I'm
going to do. I'm going to wind up at the right place at
Head crater and while I'm waiting for Al, I'll roll (garbled)
for you.
CAPCOM Sounds good.
INTREPID Looking at the (garbled)
CAPCOM Pete, Houston. Can you give us a mark when
you roll one.
INTREPID Yeh, I sure will. That crater, by golly, is
rather a steep crater. A lot steeper than it looks from out
of the LM. It's -
INTREPID Houston?
CAPCOM Yeh, go.
INTREPID I'm looking at the contrast chart in the sun
and I can see all seven shades. And I've taken a photo of it.
Now looking at the one in the shadow. In the shadow I can
see - well, depends on how close I am. If I'm within about
3 feet of it, or 4 feet of it, I can see all six shades. I'll
take a picture here, then I'll back up.
INTREPID Let me ask you a question, Houston. How big
a rock?
CAPCOM Pete, Houston. I presume whatever's a convenient
size for you. We'll check that out though.
INTREPID How about a grapefruit size rock, that's what
I'm holding in my hand and the very rocks that I was talking
to you about are buried and they're pretty large and I don't
think I could get one of them (garbled).
INTREPID Houston.
CAPCOM Roger. We copy. Grapefruit size or any size
is fine.
INTREPID Okay, Al, are you standing still?
INTREPID Yeh, I'm standing still, go ahead.
INTREPID Okay, I'm standing still, Houston, on my mark
they're rolling. Mark. It's strike down hit, hit, hit, hit.
Now it's just rolling. Roll roll roll. Still rolling.
CAPCOM Roger, Pete. We've got some jiggles that I
can see here. We'll get a reading on it for you.

INTREPID Ball rolling. Ball rolling. Very slowly. Still rolling. And it's stuck. Mark. Stop. Okay, Houston. I'm looking at the contrast chart in the shadow and it matches at three feet. I can see all six. If I back up maybe to 10 feet, as long as I stand here a moment and adapt my eyes, I can see all six also. Now, the thing that seems to have the biggest effect on it is how low the sun is. The sun is high now and so I don't have to squint my eyes particularly looking in that direction. That's really looking into the same crater even though it won't be any darker in there because the sun was there I would never be able to see. Right now I can see all six marks and I've taken the photograph. Got to go out and do solar wind now.

CAPCOM Roger, Al.

INTREPID Visibility here as on Earth really. You adapt just as well. The only major difference I've noticed is the fact that when you're out here on this area, if you look cross-sun the moon appears one color. If you look down sun it's another, if you look up sun, it's another. But unless you're in the shadows or anything else like that it's pretty much the same as on Earth.

CAPCOM 332347. Roger, Al.

INTREPID Okay, I'm taking pictures here of the solar wind for you.

CLIPPER Clipper copied.

CAPCOM Roger. We'll give you back to relay.

END OF TAPE

YANKEE CLIPPER Clipper copies.
CAPCOM Roger. We'll give you back to relay.
INTREPID It doesn't look as pronounced around the pole now that I get out here, Houston. It looks pretty much like yesterday. It just sort of, I guess it was sort of an optical illusion from inside the spacecraft. I took a couple of pictures of it, but I don't think there's anything unusual going on there.

CAPCOM Roger, Al. Pete, if it's convenient, when you can find rock there and give her a heave. Mr. Sherman sure would like to see another one.

INTREPID (garble) hole and all.
CONRAD Okay, I was setting up my rock that good things for the polarizing light. Say, I was looking at a rock that had small crystals in it. One of them is shining very very bright and clean like ginger ale bottle gleam.

BEAN Okay.
CONRAD Al, are you on your way.
BEAN That's affirm. I'm now making sure that everything is in the tool box - hand tool carrier here. I'm coming - I'm mounting it pretty firmly.

BEAN Hey, Houston. As I was working around the hand tool carrier a moment ago, the ambient bag came loose. It took me about 2 minutes to put it back together again. It came off the metal sides. It looks like those clamps are going to be completely inadequate. I expect that we're going to have trouble with it all day today. Maybe we ought to think about fixing it before the next time.

CAPCOM Roger, Al. We copied that. Do you think that once you put a little weight in it, she'll hold better?

BEAN I don't know. They don't seem to have a lot of friction. On the sides there, and the bag just floats around it. I think it should be more firmly attached some way.

CAPCOM Roger.
BEAN Okay.
CONRAD Al?
BEAN Yes sir.
CONRAD Where are you?
BEAN I'm just leaving the LM.
CONRAD Okay.
BEAN Boy, this hand tool carrier is light and nice.

CONRAD (garbled)
BEAN Compared to carrying it around on Earth. I think it's going to be - we might be able to just slip it right down inside the Surveyor trainer with us.
CONRAD Piece of cake?

BEAN Okay. I see (garbled) on the way.
CONRAD Ah, don't tell me you ding-a-ling camera.

Man.

BEAN I can see everything from fine grain basalt as I come running across the barrier here, to coarse grain ones. I see some sort of light redish-grey color rock that I would call - I don't know what I would call it - it looks almost like a granite, but of course it probably isn't, but it has the same sort of texture. The individual components - constituents are so to speak crystals but it has that same appearance.

CAPCOM Roger, Al. We copy that. Pete, can we give you any help with that camera?

CONRAD I got it going. Just fine.

CAPCOM Roger.

CONRAD I'm taking the polarized pictures right now, but Al, when you get up to me, if you'll just up sun at 15 feet and take that shot at what I'm shooting at for limit 15 2 pictures, one before and one after.

BEAN Would you let me take something out of this crater? The whole things sort of unusual. It's got a lot of those little droplets on it, those (garbled). But - but, the subsidements in this crater looks different from the others. Take a couple of quick pictures, then I'll be right with you.

CONRAD Ok'ay. Its all working out just fine. Give me the stereo (garbled). Good. We'll use the power machine, I'll pick it up.

BEAN It's right exactly - it's a very small crater, Houston. Probably about 3 feet in diameter and looks like it was made in not very fast moving or energetic or heavy projectal. Yet, right in the middle of the hole is some of these glass covered rock fragments. And on some of the other rocks it seemed to be rested in the hole. I'm putting them all in a sample bag here, I mean some of the others don't have any coating on them at all. I'm picking them up with the tongs, but can't tell how strong they are but they don't seem to hold together too well. They seem kind of weak. There you go. Now I'll hand over the work to you.

CAPCOM Roger, Al. We copy that. If you're going to document that, try to get some of the material around the glass as well as the glass itself.

BEAN Okay. I'll just get this as a bonus. I want to get over here and start working with Pete as a team, here.

CAPCOM Roger.

BEAN I didn't want to have to try to remember where that was.

CONRAD You get a big surprise when you look into this head crater, Al. It's a heck of a lot deeper than it looks.

BEAN These are nice white, small craters, with a white rim on it, about a 5 foot in diameter.

CONRAD I've been concentrating, Houston, as I came walking over here to the head crater, to see if there is any possible changes in either texture, slope, color, anything you can think of, or anything that I could think of that would say to me that I was walking on a different surface than I was when I started. And I can't identify a thing yet, it all looks the same - -

END OF TAPE

CONRAD Anything you can think of or I can think of that would say to me that I was walking on a different surface than I was when I started and I haven't seen a thing yet seen a thing yet.

BEAN It all looks the same?

CONRAD It all looks like it is covered with this - (garble)

BEAN Don't kick dust in the middle of my polarized picture here.

CONRAD I am going to stop right here.

BEAN Okay.

CONRAD Put the tool carrier down and get your upfront pictures - see where my footsteps are - that rock that is half burried - the rocks that I turned over in my footsteps. It is 50 feet (garble), two shot.

BEAN You are not going to get the before, unfortunately.

CONRAD Okay. How about right - Better have my shot here or overthere?

BEAN No, that's the pile, right there. (Garble) See where I turned over the two rocks along side the great big rock - where my footprints are. Way down there at the end. No, right here. I'll walk over to it.

CONRAD Pretty good idea.

BEAN Right straight in front of me. This rock pile right here.

CONRAD Oh. Okay. Do you want me to shoot it from right here?

BEAN Yeah. 15 feet backup. You are in (garble)

CONRAD 15 feet. It ought to be about (garble).

BEAN Okay. Got those two. Got a couple of pictures, there, Houston. Let me tell you what my camera reading is now and then we can try to keep up with it from time to time. Next time I will come over here by Pete and we will -

CONRAD Yea, Houston, I've shot 3, 6, 9. 12, 15. 15 pictures.

CAPCOM Copy, 15, Pete.

CONRAD Okay, and on my mark, I'm gonna send a slightly smaller rock into the crater. You ready?

CAPCOM Roger, we're watching.

CONRAD Mark.

CONRAD I didn't quite kick it hard enough. Wait 1 and I will do it again.

BEAN And Houston, that sample bag that I put the fragments in that I mentioned earlier, that I found in the bottom of that small crater. That's sample bag 1D.

CAPCOM Copy your mark A1. Repeat and 1D on that sample bag.

CONRAD You know it's a funny thing, Houston, it's (garble) even though slopes are steep and everything, these rocks just don't want to go anywhere.

CAPCOM Roger Pete, we haven't been able to pick it up on the PSE here.

CONRAD Okay, it was too small a rock. Take the filter off the front of my camera, would you?

BEAN (garble) And you might want a tape to the (garble)

BEAN Move your camera. Filters off.

CONRAD Okay. That's it for the filter.

BEAN And there something goes.

CONRAD Okay.

CONRAD Okay, I've got a rock over here.

BEAN Okay.

CONRAD What are we suppose to get here?

CONRAD We probably ought to come here to the other side, it looks best and do a little trench and compare some of the soil profiles. Okay, they wanted (garble) I've got an area right over here, that looks like a good area to work in, Okay. Little white spatter like craters, it looks like they are fresh impact, like that little one, right there.

BEAN Yea, that's a good idea.

CONRAD Let me go over here, there's 3 in a row and let's work this area a little bit, which is the corner of that crater they wanted us to work.

BEAN Okay.

CONRAD And we can work right here under the top of it.

BEAN What corner is this?

CONRAD In the left corner.

BEAN Okay.

CONRAD (Garble) as I indicated on the map.

BEAN Okay.

CONRAD Okay, now I don't want to get any dirt in this thing. This is pretty interesting.

BEAN Okay.

CONRAD A little secondary impact crater, huh?

BEAN Okay, you want me to step down from here?

CONRAD No, I'll get the cross sun.

BEAN Okay. (garble)

APOLLO 12, MISSION COMMENTARY, 11/19/69, CST 22:37, GET 132:15 381/3

BEAN You got to also be careful with this
tool carrier, Houston. Did you want to put this (garble)
in B?

CONRAD Oh yes, let me have my tools.

BEAN Okay.

BEAN Here's your (garble)

CAPCOM Roger Al, we copy that comment and on
the northwest rim we are looking for 2 partial pans.

BEAN Alright, we will get it.

BEAN (garble) Wait let me get my pictures,
Pete.

CONRAD Let me get over here and get the
gnomon.

END OF TAPE

BEAN Being little. Okay, let me get to my pictures, Pete. Okay, let me get over here and get the gnomon and (garble) rock right here. This rock is very typical of all the fragments around here.

CONRAD Okay.

BEAN Hey, that's interesting. Look where you kicked. That's a lighter material there.

CONRAD Boy, sure did, didn't I? Yes, that's the first time we've seen that.

BEAN In fact, you know what it looks like here. It looks like it may be this darker material - well, I don't know. I'm going to photograph that too. Let me get -

CONRAD Okay.

BEAN Let me get this.

CONRAD (garble)

BEAN Houston, it's kind of interesting here. Pete walked across one edge of the rim here. We're about - oh, 50 feet inside the upper rim and he happened to scrape an area there with his foot. It's a much lighter colored soil -

CONRAD Like cement.

BEAN Yes. Let me take -

CONRAD Get your picture?

CAPCOM Roger, Al.

BEAN Here, let me get my bag, Pete. You got to be careful with that hand throw carrier. It'll fall over.

CONRAD Right.

BEAN It's light and -

CONRAD May I have that bag number 13?

BEAN Okay. Oh.

CONRAD Okay. Al, let me photograph this thing and let's trench this whole area.

BEAN Okay.

CONRAD I dropped the gnomon in right here around my footsteps and the light's a little -

BEAN Where's this go?

CONRAD - dark and we can trench there.

BEAN Okay, I just put it into 3D.

CAPCOM 3D, Al.

BEAN In just a second. (garble)

CONRAD Al.

BEAN Okay.

CONRAD Let's see. 5 feet that way.

BEAN 12 50.

CONRAD Okay.

BEAN And, let me get a picture of what you're doing.

CONRAD Get the stereo pair on that thing.

BEAN Okay. You got to trench right there, huh?

CONRAD Yes, let me get the shovel.

BEAN Okay.

BEAN Okay. That's going to make an interesting shot. What can I give you, Pete?

CONRAD I need the shovel.

BEAN All right. I'll hold the (garble) while you grab it. Got it?

CONRAD Yes. Let me have the handle.

BEAN You need the handle? Okay.

CONRAD Can I get it? Okay.

BEAN Move over here where I can bag it better for you. Okay.

BEAN Very interesting things about this side of the mountain - I mean, this side of the crater. These deep boulders aren't uniformly distributed around. They all seem to be over here on the western side. If you look over the eastern side or the north or south, you see some, but there's quite a bit more over here on the west for some reason.

CONRAD Here you go, Al. Turn on your (garble) and help me.

BEAN Okay.

CAPCOM Roger, Al. We copy that.

BEAN Okay.

CONRAD Look at that. Stick it right in that light soil with the brown, huh?

BEAN Yes.

CONRAD There you go. Now, let me shrink it.

BEAN Okay.

CONRAD We get the Pluto for that.

BEAN Okay. Rog, you can see where you dug in but there's still some under you. Why don't you give me another scoop right in there?

CONRAD Okay. A good idea.

BEAN There's not much in here.

CONRAD Okay.

BEAN Boy, Pete digs up sure enough right underneath the surface, you'll find some much lighter grainier - Boy, I don't exactly know why at this point and you can look around now and see several places where we've walked. If the same thing's occurred, we never have seen this at all - Boy, that's going to make a good picture, Pete. Never seen this at all under the area we were before. Hey, that looks nice.

CAPCOM Roger, Al. We copy that. You think it could be the sun angle?

BEAN Listen. No, not at all. It's as definitely a change to a light gray as you go down and the deeper Pete goes - he's down to about 4 inches now - it still remains this light gray. It's - the soil must be of a different makeup as that we were on outside the crater because we have to say this is different than around the spacecraft, because we've kicked up all kinds of stuff around the spacecraft and it's all

BEAN the same color (garble) this is quite
addative. It just looks like it - I tell you what we should
do here, Pete.

CONRAD What?

BEAN Why don't you dig -

CONRAD Deep?

BEAN - deep - Yes, dig as deep as you can then
give me a sample right out of the bottom, because this will
be something new. I'll put it in sample bag number 5D.

CAPCOM Al, we copy 5 -

END OF TAPE

BEAN sample is right out of the bottom, so this will be something new. I'll put it in sample bag number 5D.

CAPCOM Al, we copy 5D. And would you give your location relative to the center of your crater, specifically are you just on the west side of it where we have the triple crater?

BEAN Yes. We're on the north west corner of it. That's where you told us to go, Houston.

CAPCOM Roger. You should be very close to that triple crater.

BEAN - there, Pete.

CONRAD (garble) crater. Well that's one crater - there is a couple of craters right over the rim there.

BEAN We're sort of in the rim deep down now about -

CONRAD That's not a good one, Al.

BEAN - down about 6 inches and it's light gray down there. Now in the back you'll see there is some darker gray material that fell in off the side.

CONRAD There you go.

BEAN Let's throw this little rock in that bag I dug up from down deep.

CONRAD Is that a rock?

BEAN Yes, sir.

CONRAD Okay.

BEAN Get another sample bag.

CONRAD All right.

BEAN That's a good one, because - well let me get a picture of it first. I dug it up out of a hole. It's hard to keep this soil in the bag (heavy breathing).

CONRAD Okay. In (garble) D

BEAN This has a little of the top soil mixed in because the sides collapsed. I think the repose is about 85 degrees, but the sides fall in. It's not the cohesive at all, even though it seems to remain nearly vertical. I guess it's the low gravity. Hey, that's a nice rock.

BEAN Pete just handed me a rock from the bottom of the hole and it's covered with gray and you can't see anything in it other than the gray dirt covering. It's all covered. Let me get a final shot, Pete. Okay. That's good.

BEAN Okay. As you move off, Pete, all I can see is white, but most of the time - hey you kicked over a rock that has a white dot under it. Quite a bit different than the top. Right behind you. You might want to take a picture of that. It's quite a bit different from those others.

CONRAD Houston. Your going to have to budget out time now. How do you want us to spend it, in head crater?

BEAN It looks like we can just spend all our time here if we wanted to -

CONRAD That's what's bothering me. We could do that any place here on the moon.

CAPCOM Pete, we show tha'te your 58 minutes into the EVA, and we'd like to get you over to Bench crater and leaving there something on the order of 1 plus 12 we can slip that a bit. So we suggest you finish up where you are - what your doing there at head and move on.

CONRAD Hey, Al. Where's the map?

BEAN Got the map right here, Pete. Let you take a look at this.

CONRAD By the way this is the smartest idea we came up with, Houston. This map just works great out here.

BEAN Okay. Let me take a picture of this rock. This isn't going to show much.

CONRAD Let me use your shovel. Now I'm trying to find the triple craters your referring to. Kick it around here.

CAPCOM Pete. That tripple crater is just south of your present position and why don't you just go ahead and move on?

CONRAD Okay. I got you.

BEAN Okay. Now, there's a good picture, Pete, let me get that one. Okay, now. Let me see which side is which.

CONRAD Well, we've got it turned on one of the rocks of the rim. The bottom part of the rock is grey, about 1/2 of it. This rock happens to be about a 6 In in diameter rock. That gives you the stereo on it. And the top is the same color as the other.

BEAN You've got it in your shadow.

CONRAD Yes. I do.

BEAN I'll take another one.

BEAN Pete, maybe you want it.

CONRAD Even these rocks out in here - even the ones that are most completely covered with the soil, if I look at them I can see a glimpse of crystals in everyone of them.

BEAN Yes.

CONRAD All right. Let me have that. There's your tube. Now we're going to head for Bench crater. Okay. Now we didn't get a pan view, did we?

BEAN No. I'm going to get it when I get to the tripple crater, which is right over here.

CONRAD That's good. We think they're right over here. I can't see them. I've got to look over the hill.

END OF TAPE

CONRAD Sounds good.
BEAN I think they are right over here, I
can't see. I've got to look over the hill.
CONRAD Alright.
CONRAD Yea, here they are. Oh Oh Oh. Hey,
things are quite a bit lighter grey on top of the hill.
BEAN Yea.
CONRAD (garble) Oh look at these craters
Al.
BEAN Boy.
CONRAD Now Houston, do you want head crater,
from triple craters, those you want. Or do you want
triple craters?
CAPCOM Pete, we suggest you just move on to
bench and comment on that double coretube, if you find a spot
that looks soft, go ahead and send the double coretube.
CONRAD We will do it in bench.
CAPCOM Roger.
CONRAD It is really a shame Houston, we could
work out here for 8 or 9 hours.
CONRAD The work is no strain at all.
BEAN I took 3 quick pictures of triple
craters, Houston.
CONRAD We're not gonna get to that other
one, bench is it. But that looks like a real interesting
area on the far corner of bench Al.
CONRAD See all those big rocks?
BEAN Un Huh.
CONRAD Some of them look as if they could be
bed rock out of somewhere.
BEAN I am kind of wondering, we're passing
up these here and they've got to be bed rock from somewhere,
we need to get a pretty good sized one from here before
we leave this area, Pete.
CONRAD I'll tell you what (garble) I will
stop right here and take a pan.
BEAN Okay.
CONRAD How does that grab you?
BEAN These rocks obviously came out of the
crater, because they are scattered more uniformly around it.
There's a bunch of them on the rim and there's not many
far away. We probably ought to grab a big one of them.
BEAN 74. Your moving straight south now.
BEAN There's an interesting rock. Hey
that's alright, let's get it.
CONRAD Let me read your camera and you can
read mine, if you would - type out a bit down there.
CONRAD Okay, your camera right now is on
36. How about mine?
BEAN 36 also.

BEAN Okay move. You copy that Houston?
CAPCOM Roger, we got it Al?
BEAN Every crater you come to you see the
glass beads. Move out of your way Pete.
BEAN Okay, now back to rock taking fitting
5 feet that enter 81250. Okay.
CONRAD Alright Al, where do you want to grab
the sample here?
BEAN Right here. I'd like to grab that rock
right there, because it's got kind of a sharp edge and all
the rest of them are - That ones got kind of a bleak edge
on it and you don't see many like that around here.
CONRAD Which one you mean?
BEAN This one right here, this grey. It
looks a little bit different from the rest.
CONRAD This one?
BEAN No, that one right there, a little
bit further - that one right there. I'll just grab it and
put it in the box, if we can pick it up.
CONRAD This one? The big one?
BEAN The big one?
CONRAD Ho Ho Ho, wait until I get the pictures.
BEAN Okay, If we can do that, we can just
put it in the bag. I think that's a different looking
rock.
BEAN This rock is different Houston, the
way it's shaped and it's partly rounded and it has some
bleak angles under it. Maybe under all that dirt is something
a little bit different.
CAPCOM Roger Al, we copy that.
CONRAD Alright, that's alright. Alright.
Pick it on up, no sweat.
BEAN Okay.
CONRAD That a boy. We've got the rock, that's
what counts.
BEAN Okay.
CONRAD Got it in the bag.
BEAN The thing that was giving it that
unusual shape was the dirt that was adhered to it. That's
okay, we will take it back with us.
CONRAD Good rock.
CONRAD And this is probably typical of the
rocks around this crater, Houston.
BEAN I think it will be a good sample for
us.
BEAN I would say the area we are moving
along now as we head South is what you say, Pete is about
5 percent rocks?
CONRAD Yea, something like that, they go
anywhere from 2 1/2 to 3 feet all the way down this

CONRAD slope.
BEAN That's right, there's even one by
you there, that's 3 feet. Look at the fillets around that
rock, Pete. (Garble).

CONRAD That's right. You see the one that's by you there that's 3 feet about - look at the fillets around that rock.

BEAN Look, that's deep -

CONRAD That's a beauty. I think we'd better stop and get that. Hold the phone.

BEAN Okay, lets do.

CONRAD Let's - maybe we can take it on two or three sides. Have to watch - the trouble is - there you go, that's a good rock.

BEAN Hey, look at the pits in it, too.

CONRAD That's (both talking at once) good strike a lot of meteorides. This is going to be a good rock Houston. It's about 3 feet in diameter, about 2 feet thick well rounded, got a lot of surface pit in it. I can see the glitter -

BEAN Listen, I got to back off to 15 feet on this one.

CONRAD Okay.

BEAN She's steriopair.

CONRAD Okay.

CAPCOM Roger, Al. We copy that. Are you able to find any chips on that rock in your vicinity?

BEAN This is not unlike unlike all the other rocks around here, Houston. All the rocks are just about -

CONRAD - my far side today. Let's get that. That's a good idea.

BEAN All the rocks we've been looking at Houston in this area seem to be the same. They seem to have a - the rock has got dirt built up on all sides of it. All directions.

CONRAD It sure does. It looks about equal too, doesn't it.

BEAN It looks about equal, that's right. Very interesting. I don't know what the means of transport but it just built up around there.

CONRAD Here's some here.

PAO That was a description of a filletive fillet as a rock with soil piled up around the edges.

CAPCOM Yankee Clipper (garbled) to LOS.

BEAN The surface of it is first pitted and there's some pits that are maybe even up to 3/8 of an inch in diameter. Most of them are small. It doesn't look like a basalts although the grains are too small for me to see anything - identify any specific one. Some of the pits have glass in it which is not too surprising and many of them don't. That's about all we can say about that rock, Houston, and that's typical of the ones in this area.

CAPCOM Roger, Al. Could you give us a sample bag number and then press on?

BEAN Okay. Well, we didn't take a sample there. The couple that we did take a sample of previously are the same types so that last couple of samples have been of the same type rocks that we're discussing.

CONRAD Okay Houston, I'm coming up on Bench crater right now. I looped off and left Al. And I can see a pan in Bench crater. This looks like a very interesting crater. It's different. Oh, and I see some really different rocks. A big one. That looks like bed rock. Gee, what a crater. Oh boy. Hey Al, look at - come on over here.

BEAN I'm coming.

CONRAD We got to get some of this. Let me get some pans in there.

CAPCOM Sounds interesting, Al. And Pete, sounds as though you're getting down to bed rock. Is that affirm?

CONRAD Yeah, they got to be bed rock. And this one in the bottom is -

BEAN As a matter of fact.

CONRAD Boy, there's some big fragments down here.

BEAN Take some pictures.

CONRAD It looks like to me that stuff is melted in the bottom of it.

BEAN I can't swear that but I'll get you some pictures. Staring right now. F8 - I think B, I, dix. Okay, let me go over on the other little bit here. Get you a good pan.

CONRAD Yeah, this rock looks pretty much the same from a distance, Houston.

BEAN Yeah, this -

CONRAD - get down in this crater. Let's just say - you are turned on (garbled) (both talking at once)

CONRAD Beautiful view. What a fantastic sight. Al, look in the bottom of that crater.

BEAN Hey, look at there.

CONRAD Do you think that stuff's melted or what? What's that look like to you.

BEAN Well it looks to me those rocks - looks to me if we got one of those central - little bitty central peaks - you know that little rebound there like the -

CONRAD Yeah, but don't they look melted on the top? Don't they look like they've been - they were molten? They're not completely jagged.

BEAN No they're not. It's hard to tell. I noticed when I was looking at that rock back there up real close that it had been hit by meteorites so much I guess it had given it a rounded appearance something like those in the hole except there's a couple over there like you say that don't look that way.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 22:57, GET 132:35 385/3

CONRAD Hey, we've got to grab one of these
pieces of rock.
BEAN Hey, hey, hey. Here's some good rock
samples right here, come on.
CONRAD Okay.
BEAN Let's get with it.
CONRAD I'm right here.
BEAN I know.
CONRAD You know me, I want to cover the ground.
BEAN Okay.
CONRAD Garbled.
BEAN They'll baloney about it all day long
in the LRL. The name of the game is to get the business done.
CONRAD Okay.
BEAN One potato -

END OF TAPE

CONRAD (garbled)
BEAN Got bologna about it all day in the LRL.
The name of the game is to get the business done.
CONRAD Okay. One patato -
BEAN Okay.
CONRAD There's another one
BEAN I got the - that rock looks a little
different.
CONRAD Okay.
BEAN I don't think its going to fit. Let's
put it in one of these bags. It'll fit in there. It's
going to go in sample bag 4. I think it's 4. Come here
you dusty booger. 64 might fit in there. No, it won't fit
in there, Pete. The rock's too big. I said put it in here
and we've got a nice picture of it so we can tell where it
came out - -
CONRAD It's a super rock.
BEAN - - pick up two or three little ones and
put them in 64, here from that same area. Here, all - -
CAPCOM Copy, sampple 64.
BEAN - - crater, in - from nice rock. Get some
here that we took the picture of.
CONRAD Yes. Wait a minute.
BEAN Okay.
BEAN Yes. I don't think I got that in the
picture.
CONRAD Okay.
BEAN May not have. Hey, you notice that under-
neath the soil on the rim too, its the light gray.
CONRAD See that stuff - let's go over to that
corner and try to get a - break off a piece of that big
rock. That looks like a good one to me.
BEAN That's a good idea. Go on and put 64 in
there and use it.
CONRAD There are a couple of small rocks that we
just picked up from the area we have been discussing. It
doesn't - I don't think they've viewed in the photo, but
that won't make any difference. It's just typical of the
other rocks around here.
CONRAD Holy Christmas¹/₂ What's this? Look at
this, Al. It's picking up the same sort of light gray.
Apparently, on the rim's here, you get that light gray, Al.
Look at this stuff.
CONRAD No, no.
CONRAD Hey, that's interesting.
BEAN What do you suppose that is?
CONRAD Hey, we can't - here's something interesting,

CONRAD Houston. Hey, it looks like a surface - what we got is - looks like kind of a semi-buried rock.

BEAN Hey, there's a small piece of it over there to the left. See it, Pete? We'll be able to catch it and put it in the bag. See that up there?

CONRAD Yes.

BEAN What it looks like is a buried rock, not unlike the others around here, except it appears to have some sort of coating on it, very irredescent. Lot of crystal shining in it.

CONRAD I'll tell you what's happened is it's been laying in the ground and it's been hit by another fragment.

BEAN Think so?

CONRAD Yes. Look at the glass beads, too.

BEAN Yes. They're all over the place.

CONRAD I know. Okay, you want to jut that piece over there and I'll put it. Let me get the sample.

BEAN Yes. Let me get the sample of it. Okay.

CONRAD That will go in sample bag 7L.

CAPCOM Copy, 7. And would you go ahead and give us some picture numbers also?

BEAN Okay. We'll give you some in just a minute. Pete's picking up a small piece of this rock and maybe you could get a piece of (garbled) right off the middle.

CONRAD That's what I wanted to do.

BEAN Okay.

CONRAD There.

BEAN Let me get out of your way so you can see it. On the edge of the scoop area right there.

CONRAD Okay.

BEAN That's got an interesting coating on it. That's different from what we've seen.

CONRAD Yes. Maybe this is more newly exposed than the (garbled)

CONRAD Is that all you want to put in that bag?

BEAN Listen. Hand me the scoop and let me get some of those glass beads and stuff there.

CONRAD All right. Let me get you the scoop.

BEAN Okay.

CONRAD How long have we been going, Houston?

BEAN Got it, Pete.

CONRAD (garbled)

CAPCOM Pete, we show you're 1 plus 14 into the EVA and we'd like you to move on from this crater at about 1 plus 27. If you could, then go on down and take a look at the bedrock on the bench.

BEAN The rock - we better not put that in there - that's what we wanted to show them. Let me get you another sample bag.

CONRAD Ba. I hate to try to get down to the bottom of this fellow. It's awful steep.

CAPCOM Okay. Hold off on that. Don't go ahead. Negative on the request.

CONRAD But I'm going to get you - we're going to get you some of the bedrock. It looked like (garbled). All of it looks the same.

BEAN We're working on it.

CONRAD That's 8D.

BEAN (garbled)

CONRAD What happened to 1, 2, 3, 4, 5.

BEAN Here's another one.

CONRAD Okay.

CONRAD What we're putting in here now, Houston, is some soil right next to the rock that we previously just got. I think Pete's got a nice fragment of that rock that's going to end up in this bag, too. Catch that one.

CONRAD The old fool.

BEAN That's a beauty. That thing is fairly weak, they fractures right off of them. You've got to get some control there, (garbled), you're overpowering it. It's One-sixth g up here, Houston. You lift something up in your scoop, and when you stop the scoop it just keeps going up in the air.

CONRAD (garbled)

BEAN Yes. It would.

END OF TAPE

CONRAD At 1/6 G up here Houston, you lift something up and you scoop it. When you stop to scoop, it just keeps going up in the air.

CONRAD (garble) Laughter. Looked good though.

BEAN Put that in the bag.

CONRAD There you go.

BEAN We need to put more samples in the bag.

BEAN And they are saying that they can't hardly use those little ones.

CONRAD They won't fit in there any bigger.

BEAN Yea, I get it.

CONRAD Okay.

CONRAD Okay, let's go over here and get some of that good rock. Looks like bed rock to me.

BEAN Looks a lot like the fragments we've been seeing laying all over the place, but this stuff obviously - I'll bet you we have a total of about 3000 rocks right now.

BEAN Yea, I'm with you.

CONRAD Okay, we're gonna have to grab some bigger peices.

BEAN I'm trying to get down inside of the crater there to see how it is going up the bed rock.

CONRAD Boy, this is interesting, I want to get this area right here and see if I can't sample it.

BEAN Good move.

CONRAD If I don't fall down in the crater. That's a boy. Well this is different, look at this, Al? It is different, we'll get some of this.

BEAN Okay.

CAPCOM Al, Houston. Over.

BEAN Go ahead, Houston.

CAPCOM Al, we would like you to go to intermediate flow for a minute and a half. We will give you a call.

BEAN Okay, what's the problem?

CAPCOM We're looking at a slightly lower than nominal feed water pressure.

BEAN Okay, It's cooling real fine.

CONRAD Look at the glass all over those rocks.

BEAN (garble)

CONRAD I want to bring this back. Look at it.

BEAN Okay.

CONRAD Okay, let me put this in there. Oh, it's gonna fall.

BEAN There you go.

BEAN Hold it.
CONRAD Watch it. Okay. Now I'm gonna get
a bunch of these.
BEAN Let's do, let's get a bunch of them
and then - have any rocks to bring back. Doing the best
I can.
CONRAD There you go, there's a good one.
Put that thing in here.
BEAN After I have closed the bag, will we
make it work?
CONRAD Had to take that big piece right there.
Look at it, it's got spattered glass or something all over
it.
BEAN Why don't we take a big piece of it?
And sample bag.
BEAN I'm with these sample bags, whether
they are the round ones, the square ones or the flat ones
they are all the same type. What you need is a sample bag of
little ones for these and some big ones for the bigger
rocks. Okay, 9B is the sample we just picked up and described,
Houston.
BEAN Okay, put this right in here, Pete.
CONRAD No, wait a minute, here's a better
one.
BEAN Okay, now we are working on sample
bag 10B.
CAPCOM Roger, copy 10B and on your way out
would you get that partial pan with a 75 foot base line?
BEAN We will sure do that.
CONRAD I already got the pan.
BEAN Pete says he already got it.
CONRAD Got a stereo partial pan.
BEAN Okay.
CAPCOM Roger.
BEAN Okay, that's a good rock and that
one fills that one up.
BEAN Okay, Pete what is your next pleasure?
CONRAD I don't know, what do you think Houston?
CAPCOM Your looking in good shape, you can
press on along the trevis over to sharp crater.
CONRAD Okay.
BEAN Why don't you take - Oh, you already
got a snapshot of this, didn't you Pete?
CONRAD Wait, Wait, Wait. Sharp crater, that's
funny, I can't locate it.
CAPCOM Pete, from your present position
that's - - -

END OF TAPE

BEAN Why don't you take a - well, you all ready got a snapshot of this, didn't you Pete?

CONRAD Wait, wait, wait - crater. That's funny, I can't locate it.

CAPCOM Pete, from your present position, that's about 400 feet southwest.

CONRAD 400 feet southwest - it's got to be on that hill right there.

BEAN How about right there?

CONRAD Right there. Okay. Let's try it.

BEAN 400 feet southwest.

CONRAD All right. Now we want to get the core tube and that gas sample and a bunch of good things, right Houston?

CAPCOM That's affirmative, Pete. All those good things that (garble).

CONRAD Got to find them first.

CAPCOM Al, you can go ahead and put that diverter valve to your choice. Your feed water pressure is holding even. Looks as though it's working well. It's slightly lower than nominal.

BEAN Okay, Houston.

CONRAD (garble) crater, where are you?

BEAN Got it pinpointed, Pete?

CONRAD No. I can't find it.

BEAN Well, we're going in the right direction.

CONRAD There's one right over here kind of more to your right.

CONRAD I'm looking down 0 phase.

BEAN There it is. That's got to be it right there.

BEAN Yes. I see it.

CONRAD There it is. Big fragments out here.

BEAN You can say that again.

CONRAD Have you got the shovel?

BEAN I sure do.

CONRAD Good boy.

BEAN No, that's not it either.

CONRAD Better we stop here and look at the chart a little bit.

BEAN Okay. Man does that LM look small back there.

CONRAD Yes. I'll tell you what. I'd better get a tie anyhow. Look at the chart.

BEAN Okay.

CAPCOM Roger. Are you going to give us a backside survey at that point, Pete?

CONRAD Yes. I'll make it a full pan. Darn far out. I may as well.

CAPCOM Okay. A full pan over when you get to (garble). Be sure your 1 plus 23 into the EVA and we're

CAPCOM looking to leave a sharp crater on
 1 plus 51, so you've got lots of time.
 BEAN We've got a 5 (garble)
 CONRAD I cannot agree with you,. Where is
 it.
 BEAN I don't know. We should be right here.
 CONRAD I got it. (garble) sharp crater.
 BEAN Looks pretty small. It looks to me
 to be about 30 meters.
 CONRAD Okay. I've got it. It's right
 here in front of me.
 BEAN Okay?
 CONRAD Yes. That's it.
 BEAN That little box?
 CONRAD Take your choice.
 CONRAD This has got to be the sharp crater
 right here. We'll drive the double core tube in here.
 BEAN Okay.
 CONRAD Yes. This has a nice white rim -
 white rim on it. In fact, this looks pretty much like the
 area where we tipped over on the previous craters. I'm
 not sure this is sharp crater, but let's use it anyway,
 because it's the only one out here.
 BEAN I know. There is nothing out here.
 CONRAD It's the darndest thing I've ever
 saw.
 CAPCOM We're estimating a diameter of sharp
 crater peak of about 40 feet.
 CONRAD 40 feet, huh? Well this may be it.
 This is it. It's got to be it. It's got a nice raised rim
 on it.
 BEAN Yes. Look at that.
 CONRAD It's raised up about - what do you
 say - 2 feet?
 BEAN Yes. The trouble is that I'm running
 0 phase. It's like you never - oh, yes, look at - Ouuu₂.-
 Hey, this is the same color as all that subsurface material.
 CONRAD It's awful soft in here, watch it.
 BEAN Okay.
 CONRAD Holy, Christmas. Look at that. Say,
 you know something, Houston. Hey, Houston.
 CAPCOM Go ahead, Pete.
 CONRAD It looks like glass affect coming our
 of it. Looks like it's got glass affect radium all around
 it. This has got to be fairly fresh to the - Look at that
 isn't that neat? We might get some pictures of that.
 BEAN Okay.
 CONRAD I don't know what to set it on -
 74 I guess - we're not that far away. Boy the rim is soft
 and it is quite a bit softer than the others. But look
 at the radial ray pattern

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 23:12 GET 132:50:60 388/3

BEAN Beautiful.

CONRAD It's that. I guess I'm supposed to
drive the what - double core tube here or something.

BEAN That's (garble)
Look at that.

CONRAD Have we got to dig a trench?

END OF TAPE

CONRAD Beautiful
BEAN Spectacular.
CONRAD I guess I'm supposed to drive a what
double core tube here or so.
BEAN Got to set that baby up.
CONRAD Look at that.
BEAN We got to build a trench.
CAPCOM Al, we'd like to get the trench site
sample there and you can hold off on that double core tube
until you get over to Halo crater.
BEAN Okay. Good.
CONRAD Al, were supposed to look left for
Copernican range here too. Houston, there's no way to tell
the difference contact wise. You agree, Al.
BEAN There's no way. Now this one is
fresh enough so that you can see, like you say some of the
rays but any crater older than this there doesn't appear
to be any way to tell the materials from inside the crater
from that that was there when - I mean, right on the surface
before the crater was formed. There's no differentiation at
all. Let's see. Which sample do you want now?
CAPCOM Al, we're looking for the trench site
sample. That includes your environmental sample of trench
and the gas analysis you can put in there, too.
BEAN Okay. We'll do the whole smash here
for you.
CONRAD You want it right in the crater rim?
BEAN That's what it says.
CAPCOM That's affirmative. That would be
perhaps the easiest and best place to do it and you can get
that one core tube down in the bottom of the trench.
BEAN Yep, yep, yep. Okay, Pete. Before
you do that you're going to have to lift this up so that I
can take the sample out.
CONRAD 81 - he'll be right with you.
BEAN Okay.
CONRAD You going to do it right there?
BEAN Yep. Lift it up and I'll reach in
there and grab the (garbled). This will be the one for the
soil here.
CONRAD Okay.
BEAN There's one thing I've noticed used
in carrying the tools but because of you're glove, you
don't feel any of the temperature here.
CONRAD Turns out nice and bright, but it's nice
and cool in here except when you're carrying something metal,
like the hand tool carriers or the shovel or something. Then
your hand starts to get warm.
BEAN Could you get out of the -

CONRAD Yeah.
BEAN Could you just slide a little bit.
CONRAD Okay, let me slide right over here.
That's a new one.
BEAN Oh wait a minute. I've got to do it
over here. Done.
CONRAD Hey Houston.
CAPCOM Pete, go ahead.
CONRAD Did you take a picture before, Al?
BEAN No.
CONRAD Yeah, nothing Houston. We're okay.
BEAN I'll take one right now, Pete.
CONRAD That's a good spot right there, I believe.
BEAN Okay, go ahead, Pete. Being in that
stuff, now. You could drive three core tubes down there.
CONRAD You sure could. It's soft.
BEAN Yeah. Got down about 8 inches. Pete's
digging in the - digging a nice trench.
CONRAD Wait, wait let me get the trench pictures.
BEAN Okay.
CAPCOM Okay, Al. Could we have some numbers
along with those pictures?
BEAN Okay, we'll have to give them to you
Houston. We've been kind of delinquent there. Fine grade,
very fine soil here.
CONRAD Okay, Al.
BEAN Okay, I'm ready to take a look at my
(garbled) numbers.
CONRAD Okay. You're on number 105 milar.
BEAN That's okay. I'll trade cameras with
you because you've been (garbled) DSKY. Okay.
CONRAD Okay.
BEAN All right, now what do we want to do?
Fill that with dirt and and rocks?
CONRAD We sure do. Fill the big container
with dirt.
CAPCOM Pete, we copy you're on 105.
CONRAD Be careful now.
BEAN Wait a minute, wait. The tools didn't
go in.
CONRAD That's okay.
BEAN That stuff is really funny. Now I
can't see the trench and I know you can't.
CONRAD That's - oh boy. Yeah. Let's get
organized.
BEAN Yeah, and when you get it in there
try to tap it maybe it will come all together. You got to
come this way.

CONRAD Okay.

BEAN See, what's happening is my arm is being turned by the cables. There, there. Maybe you grab the handles closer to the thing-a-ma-gig down there when you lift it up.

CONRAD Okay, we need some more.

BEAN There you go.

CONRAD Wait a minute.

BEAN There, that's the game.

CONRAD Wait a minute. That's the game.

BEAN Yeah, but you get half of it that way.

Okay, building some more.

CONRAD I think one more scoop should do it though. That's a thought. Watch yourself. You're getting close to the crater.

END OF TAPE

BEAN One more snip ought to do it, though. Ah, that's a ball. Watch yourself. You're getting close to the crater. Get about 10 percent and then -

CONRAD It does, huh?

BEAN I'm going to do one more and that's it.

CONRAD Okay.

BEAN One more and you'll make it. That's all. I'm just - isn't anything holding it together. It takes me back and my (garble) and I just - you know - you wanted to fling things around good. Okay, that's it. Bag full. And now let me put the lid on.

CONRAD I'm sorry, but I just can't lift foot turn too.

BEAN Okay. Can I help you with that?

CONRAD Wait. Wait. Why don't you?

BEAN I'll hold this and you get the lid.

CONRAD Right here.

BEAN Okay.

CONRAD Yes. Let go. I got it. Okay, you put the lid on.

BEAN All right. Here's the lid.

CONRAD Boy.

BEAN Right on the top. Houston, this dirt came from about 8 inches down. Wait a minute.

CAPCOM Copied. 8 inches down and what's the sample bag number on that?

BEAN This is the deep trench sample in the - doesn't fit right there - Okay, same one. Okay, now just - I roll it. Isn't that ridiculous? Maybe this is a (garble) time.

CONRAD I'm just jamming on it.

BEAN It's not slight. It's not this (garble) at (garble) you know. Now you hold it nice and tight. I'll tell you what's the matter is that you're getting friction. Wait, wait. Hold her tight. Here, I'll get it.

CONRAD Okay.

BEAN You got it.

CONRAD I can't (garble)

BEAN Suppose you're getting some vacuum welding?

CONRAD Okay.

BEAN Okay. That's it. Put it down tight a little bit more. Go ahead. Atta boy. Is the other top off?

CONRAD Okay.

BEAN That's a good top on that one. Hold on. Okay, let's go. Good.

CONRAD Okay, now you need a core tube in the bottom of that trench. Is that right, Houston?

CAPCOM That's affirmative. And, Al, when you get a chance can we get your photo numbers?

CONRAD That's right. And this is core tube number 2.
BEAN Core tube 2 and I'll need the - there you go.
Ought to be a good place, Pete. Relatively fresh stuff here.
CONRAD Yes, you'd better believe it. Very good.
BEAN Okay, it's going to - I can almost drive it
without a hammer, but if you'll hand it to me, I'll get it
in just a second. I want to take a couple more shots of
this before we leave.
CONRAD Okay.
BEAN They're all in. I'll get the pictures.
CONRAD All right. Driving in real easy, Houston.
BEAN Good.
CAPCOM Roger.
BEAN All right. I can't lean down too far now.
Yes, we're driving it all the way in pretty easy. That way.
Wait one. Up.
CONRAD That's it.
BEAN Roger, just a second. Let's put this up. Let
me take a picture of it, Pete. Make sure we got it documented.
CONRAD Do. I had this (garble) picture. Okay.
BEAN All right. This dirt's gotten on my camera
and I can't see the settings anymore. We'll have to do
something about that.
BEAN Okay. You ready to put the top on this
core tube?
CONRAD You'd better believe it.
BEAN Okay. Here we come. I hope that soil stays
in there.
CONRAD Leave it there.
BEAN Probably did with (garble) script so well.
CONRAD You'd better believe it. Full.
BEAN Okay.
CONRAD Come over here with it.
BEAN All right. There you go. Better.
CONRAD Good sample.
BEAN Yes, it is. A good sample.
CONRAD There you go.
BEAN Ah, get the cap on and you're halfway.
CONRAD Okay. Just a minute.
CONRAD Okay?
BEAN Scoot back on.

END OF TAPE

BEAN Just a minute.
CONRAD Careful there, scoot back on and I
will stow it.
CONRAD Okay, Houston, what else do you want
here?
CAPCOM Okay, we show you should have gotten
in the turn sight sample the coretube sample from the end
from the bottom and also the gas analysis.
BEAN Okay, we need some little rock fragments
from this area.
CAPCOM Roger, that's surface rock fragments.
BEAN Okay, just a second.
BEAN Yea, we're gonna get it (garble)
CONRAD Got to find it first.
CONRAD Do you know (garble)
CONRAD (garble) I'll move it around and see
what you see.
BEAN Yea, Yea stick your hand straight down.
Towards your knee, that a boy, got to have it. Got it
almost got it.
CONRAD Some little rocks in here.
BEAN Little rocks. (garble)
CAPCOM Roger. Copy. You got some little
rocks in the gas analysis and would also confirm that you
have gotten the environmental sample?
BEAN Pete, have you got the - -
CONRAD I got the environmental sample, we
got the test tube and I'm trying to find a little rock.
Conrad Little rock. There's a lot of them.
BEAN There's a neat one. There it is right
there.
CONRAD Ho Ho, just right for that little
can.
BEAN Give me a few.
CONRAD (garble)
CAPCOM Al, your PLSS feed water is back up
to nominal and all looks good.
BEAN Okay, thank you very much, Houston.
BEAN See those bright shiny ones there,
Pete?
CONRAD Yep. Yep. Yep. Yep. (garble)
BEAN Just a second, Pete.
BEAN Okay, got a picture of them.
CONRAD How about those right there? Right
there, see them shine?
BEAN The little ones.
CONRAD No No. Move over this way. This
way. Up (garble) right there. No. Hey that's a neat
one, that's grand. Look at that.
BEAN Right next to it.

CONRAD Yea here, one at a time.
CONRAD That's a good sample for them.
BEAN And that peice right next to it,
right there.
CONRAD Okay.
BEAN Houston, how far are we from the LM?
CAPCOM Stand by.
BEAN (garble) Laughter. Hey we need some
more Pete. Give me a bigger rock. Here's not enough to
do it.
CONRAD Hey come on, I'm getting tired of
picking up those little things. There's nothing in there.
BEAN Where is my stupid tools.
CONRAD There's one.
BEAN Get a big one.
CONRAD There's one right there.
BEAN Here, this one?
CONRAD Yea.
CONRAD I don't think that will fit. Let's
try it.
BEAN No fit.
CAPCOM Pete and Al, we show you're 1200 feet
from the LM.
CONRAD Okay.
CONRAD Come on Al, we're wasting time.
CONRAD There you go.
CAPCOM Pete, as soon as you finish up there,
you can head on back toward the East, towards Halo crater.
No need to go any further West.
BEAN Got it, Pete?
CONRAD Yea, let go a minute.
BEAN I'm with you, Houston.
BEAN Hey good show Pete, good turning.
CONRAD There you go. The front of my lens
is clean, relatively speaking. (garble)
BEAN Okay, (garble).
CONRAD Okay, give me one gnomon and my
shovel.
BEAN Here's your shovel.
CONRAD Headed for Halo crater.
CAPCOM Okay, Pete, we will give you a radar
vector on this one. If you will go over just directly
East of Dutch crater, and you can continue on East until
you are just about directly opposite the LM, and then a
couple of more steps ought to take you to Halo crater.
CONRAD Sounds like a pretty good vector.
That also says that we are running right into the sun,
does that agree with you?
CAPCOM That's affirmative, you will be
running right into the sun and directly at your 9 o'clock
position you will see the LM and then a couple of more

APOLLO 12, MISSION COMMENTARY, 11/19/69, CST 23:27, GET 133:05 391/3

CAPCOM steps and you will be right there.

CONRAD I've got the LM in sight to my 10
o'clock. You know what I feel like, Al?

BEAN What?

CONRAD Did you ever see those pictures,
with giraffs running - - -

END OF TAPE

BEAN - - rocky.
CONRAD You know what I feel like, Al?
BEAN What.
CONRAD You ever see those pictures of giraffes running in slow motion? That's exactly what I feel like.
CAPCOM Say, would you giraffes gives us some comment on your penetration as you move across there, what your doing now and what you had back there at Sharp crater?
BEAN Oh, it's much firmer here. We don't sink in anywhere near as my (garbled) across some of my own tracks.
CONRAD Yes.
BEAN The toes sink in a bit, Dean, as you push off. You land flat footed so your heels don't sink in, but as you push off with your toes, they sink in about 3 inches. Your heels are only sunk in perhaps an eighth of an inch.
CAPCOM Roger. Thank you, Al.
BEAN - - kick off on your toe. Every time you land, it sends little particles spraying out ahead of him, and to the side of him and everywhere else and they go out maybe 2 feet to 3 feet around him.
CONRAD Okay. We're back at Bench crater. Now, have we gone too close to the LM? Going on the south side of Bench crater, Houston.
CAPCOM Okay. Now, if you'll just go directly to the east of the center of Bench crater, and then continue directly east right into the sun, and then at 9 o'clock, you'll see the LM and a couple of more steps and you'll be there.
BEAN Okay. I've got the decided feeling I'm going to sleep tonight.
CAPCOM Pete, the crater you're looking for, Halo Crater, is about the same size as Sharp Crater and should resemble it.
CONRAD I think I have it in sight but I'm not sure (garbled).
CONRAD I'll tell you what I'm going to do, Houston. I'm going to take and EMU break. How you doing, Al?
BEAN Okay.
CAPCOM Pete, the deminsion on Halo Crater is about 20 feet, so that would make it half of what you saw at Sharp.
CONRAD Okay. Now, Halo. I wonder if I'm - you suppose this is it, Al?
BEAN Well, it doesn't have any halo around it.
CONRAD I know. But you never can tell from here. Let's look at the map when you get here. I'll tell you one thing I'd go for is a good drink of ice water. (garbled)
BEAN Let me look in the map, Pete.

CAPCOM Pete, now, can we have an EMU check. And one way to locate it also, is that it should be right on the rim of Surveyor crater and you ought to see Surveyor off directly to the northeast.

CONRAD Okay. I know where we are. That EMU check of mine reads about 55 percent 02, Houston.

BEAN Mine reads 55 02 also, Houston.

CAPCOM Copy. 55 both.

CONRAD Beautiful, bound, lead ball we got to have Al. Quarter of an inch. And the sample bag.

BEAN Just a minute. Coming.

CONRAD Look at that. (garbled) just a second. First time I've worked up a heart rate, I think. Okay.

This is sample bag 11D. I didn't take a picture, I just wanted to -

BEAN Okay.

CONRAD Watch that crater behind you. Don't step back.

BEAN Wait a minute.

CONRAD This is the last.

BEAN I know. I was thinking of this. We got a total of about 5 pounds of rock.

CONRAD Okay.

BEAN I'd hate to have us get back to the LM and then have to fill it up around there again.

CONRAD Al, where's that Surveyor crater?

BEAN Okay. If I could only get to the bottom of that baby. You could take a rest here.

BEAN Yes. Funny, do your hands get hot holding that shovel?

CONRAD My hands - -

END OF TAPE

CONRAD (garble) when we get to the bottom of that baby, let's take a rest here.

BEAN Yea.

BEAN Do your hands get hot holding that shovel?

CONRAD My hands get hot period. I guess - I don't know whether it is the shovel or what.

BEAN You know - like now mine are cool. The minute I start carrying the tool carrier, they start warming up. Doesn't look like that thing would be that hot.

CONRAD Yea, I'll tell you what, let's see, we will try something. Look over here and smile.

BEAN Hey, picture.

CONRAD You are right through my crater.

BEAN There's the LM.

CONRAD Right in the background.

CONRAD Looks great. There you go.

CONRAD Alright, let's ease off at a nice slow pace. I think this is Halo crater, right up here in front of us.

CONRAD Hey Ed, you might tell Fred Hayes he ought to be quite working on running and work on holding things in his hand. My legs don't get a bit tired, but your hands get tired carrying these tools, particularly the hand tool carrier.

CAPCOM Roger Al, sure will. I'm sure he is listening.

BEAN Yea, that's funny, you wouldn't think it that way.

BEAN Yea, tell Jim Lovell to practice digging.

BEAN Look at all the - - Look here Pete, now we are crossing across something that has got a completely different texture to what we have been on. Look a here. We got -- Let's take some pictures here.

BEAN We have run across a sort of a textural contact. We are suddenly on an area that is quite not so smooth, it's got ripples and wrinkles in it. Want me to take some pictures or what Pete?

CONRAD Yea, why don't you come up here?

BEAN Okay, And we will take a couple of good dirt samples of this stuff.

CONRAD Okay.

BEAN I will get the - -

CONRAD You know, I think this looks like the material that we talked about the first day in front of the LM.

BEAN Maybe it runs past the LM down into this area.

BEAN It is sure different then where we

BEAN have been. Looks like it is more of a - -
the material is more cohesive in clumps instead of being
so nice and smooth.

BEAN Let me go around behind you.

CONRAD I was waiting for the gnomon to damp
out.

BEAN Okay, right here. Good shot here,
Pete.

CONRAD I want to be getting my footprints
in it too, so they can see that.

BEAN Okay.

CONRAD Uh oh.

CONRAD You know, I think I will take some
a little further away.

BEAN Back up a little. Shoot a 15 foot
one. This Okay.

CONRAD Yea.

BEAN I'm gonna dig.

CONRAD Alright.

BEAN I will be back to collect it in just
a second, let me get this 15 footer.

CONRAD Is a Halo crater a slightly big -
yea.

BEAN Hey, I'm shooting about 4 here.

CONRAD Okay.

CONRAD Let me get some sample bags and we will -

BEAN Okay, Pete.

BEAN Okay.

CONRAD Boy it sure is finer isn't it? Kind of
like over at the other - Shark crater.

BEAN Looks the same except on the surface.
It looks almost finer.

CONRAD Ah Huh.

CONRAD (garble) If you saw this on earth,
you would think it was real soft dirt that it had just
been rained on recently.

BEAN Not hard rain, but just a sprinkle,
so that the drops -

CONRAD There you go.

BEAN Now, there's a good sample.

CONRAD 12B, Houston, is the sample bag number.

CAPCOM Copy 12B.

CONRAD Does Halo crater have a couple of
dimple craters in the south side of it?

CAPCOM Stand by, Pete.

CONRAD Okay.

BEAN We can collect rocks, while we are
waiting, Pete.

CONRAD Yea, well look, I think this is
Halo crater right here.

APOLLO 12, MISSION COMMENTARY, 11/19/69, CST 23:37, GET 133:15 393/3

BEAN Alright, let's ease over there.
CONRAD Let's go get some rocks from it we're
seeing it - We actually have the soil sample from it.
BEAN Okay.
CONRAD This isn't 20 feet in diameter. Is
it right on the rim of the Surveyor crater, Houston?
CAPCOM That's affirmative.

END OF TAPE.

CONRAD I bet this is a 20 feet diameter. Is
it right on the rim of the surveyor crater, Houston?

CAPCOM That's affirmative and from your comments
on the three gimbals, we show that you're there.

CONRAD Okay. What do you want in it?

CAPCOM We'd like to get the pan and the double
core tube.

BEAN I can't believe that we're at the
right place.

CONRAD I'm not sure we're at the right place
either. Let me look at the top of this hill here. This
is surveyor crater. Let me look at the charts.

BEAN There's a nice rock right there.

CONRAD There's surveyor.

BEAN Let me look at the map.

CONRAD It's hardly a crater worth looking at
where we are.

CAPCOM Okay, Pete. It's your call there. You're
the local experts. If you see a better location for that
double core tube go ahead.

CONRAD We're trying to find the right crater,
Houston.

BEAN Hey Pete. I think it's that area right
over there. Halo is this first one right here, the little
one and then all those others are next over, according to the
chart.

CONRAD Okay.

BEAN So we can just go over there and -

CONRAD Which one's Halo? This one right here?

BEAN This nub right - you see where I'm
pointing to? As I see it, it's that one right over there.

BEAN Okay. Let's go.

BEAN Okay.

CONRAD Could I have the double core tube?

BEAN Okay.

CONRAD And you want what Houston, a partial
pan?

CAPCOM That's affirmative. We'd like a full
pan at that point, Pete. And also, Al, if you could give
us some sort of an estimate of how hard it is to get the
core tube in. That is, what the force is to you as how many
pounds and how much force.

CONRAD Sure will. Hey, look at this little
neato crater right here. It's a good place to sample. Oh,
look at all the glass in the bottom of that baby.

BEAN Got a lot of that.

CONRAD What?

BEAN Got a lot of glass.

CONRAD (garbled) I think that's Halo right
there.

BEAN Which one? The one you're looking at.
 CONRAD Right over there. That one right there.
 BEAN It's big.
 CONRAD Too big, huh. Let's take this one
 right here.
 BEAN All right. That's good.
 CAPCOM Pete and Al, could we have a readout
 on the cameras at this time?
 CONRAD Sure could. Just a second.
 BEAN Yeah. See mine probably. Pete.
 You'd better take all these pictures. I'm running out.
 CONRAD Well, I'd better change cameras because
 (garbled).
 BEAN 110. You've got plenty to go.
 CONRAD You know what's happened?
 BEAN Un un.
 CONRAD This thing hasn't been taking every
 picture.
 BEAN Take a picture and let's see.
 CONRAD I just caught it. I think its been
 doing it intermittently.
 BEAN Okay. Take it out and take the double
 core tube here.
 CAPCOM Pete. We copy 60 and 110 on the
 film.
 CONRAD That's affirm.
 BEAN Here look at the chart a minute, Pete,
 while -
 CONRAD Yeah, okay.
 BEAN Be careful. (garbled)
 CAPCOM Pete and Al. We'd like you to go ahead
 and get the pans taken on the LMP's camera. You can either
 have Al do the pans or switch cameras. Your choice.
 CONRAD Okay, roger.
 BEAN Okay, Pete. You'll have to unscrew -
 pull the pan and unscrew that if you can. Okay. Good
 luck (garbled). Hey wait. Hold it just a second.
 CONRAD I'll get it.
 BEAN Okay. Hey, good show.
 CONRAD Okay.
 CAPCOM Clipper, we read you loud and clear.
 CONRAD Double core tube.
 BEAN You could drive it.
 CONRAD Give it a go.
 BEAN I'm going to hand you the hammer. Make
 sure that double core tube screws on as far as it should.
 CONRAD I'll try it again.
 CAPCOM Pete and Al, Houston. Be sure you give
 us the number of the lower core tube please.

APOLLO 12 MISSION COMMENTARY, 11/19/69, CST 23:42, GET 133:20 394/3

BEAN
I think. Okay, the lower core tube is number 3,
CONRAD Yeah. 3 and the other one's 1.
BEAN Okay.
CONRAD I need a pounder.
BEAN Where you doing to drive it?
CONRAD Where would you -

END OF TAPE

CONRAD Okay. The lower core tube is number
3, I think.
BEAN Yes, 3.
CONRAD 3 and the other one is 1.
BEAN Okay. I need a pounder.
CONRAD Where are you going to drive it?
BEAN Where would you recommend?
CONRAD Well, let's go over to this crater
right here.
BEAN Okay.
CONRAD Make (garble) around those little
(garble).
BEAN Where, right here?
CONRAD Yes.
BEAN Want to take a picture?
CONRAD Yes.
CONRAD Think you can shove it in that little
hole. This is a good soft place.
BEAN It seems to be.
Oh, I hit something solid there. Well, I shoved it in and I
used all my weight, Houston, and shoved it in about 11 inches.
BEAN Now, I'll just pound on it and see what
we can do.
CONRAD It's going in okay.
BEAN Yes. It's going in down. Keep wondering.
CONRAD No. We've got a good spot.
BEAN I don't think I really think this is
the right place.
BEAN Some of those things aren't so obvious
that they are so solid, either.
CONRAD Yes, It's going.
BEAN Wiggle it a bit.
CONRAD We've got one tube completely in now.
BEAN We have to hit it harder
BEAN Hey, Houston. This Hammer - when
you hit on the side of it, like you have to do, to get it
within this shute, it knocks little chips of metal off the
side of the hammer. I don't think that's too good.
CAPCOM Roger, Al. Is it damaging the hammer
or the core tube?
BEAN I'm afraid some of the fragments will
damage the shute. It's not damaging itself. You know
it's just breaking the - hey I'm better left handed than
right. There goes another fragment. Do you see it, Pete?
You even hit it with the front end and some of them pop off.
CONRAD It's flying all over the place.
CONRAD Okay. He's up to the bottom of the
hand grip portion of the tube. He's really driving that
baby.
BEAN Look at that - look at that - it
looks like it's got a coating over the hammer, Pete, and
I'm knocking the coating. Could be the steel or aluminum

BEAN hammer chips in there from the coating?
CAPCOM That's affirmative, Al. There is
a coating on that hammer and that some of what your knocking
off. And also we want to be sure to get the site documented.
CONRAD We'll document it for you.
CONRAD Coming up.
BEAN We almost got it, Pete.
CONRAD Almost.
CONRAD Hit something solid there, didn't you?
BEAN No. It's just getting down there, Pete.
CONRAD Hey, that baby is in the ground.
BEAN We've got it in. The question now
is can we pull it out?
BEAN Let me get the (garble)
I hope that's a good spot.
CONRAD Me too.
BEAN I've got to get some of these rocks
(garble)
CONRAD Okay. Let's see here. 250, 11.
All right.
BEAN Give me that or something, so I
can see where this came from.
CONRAD You do it. I don't have that much
film.
BEAN Okay.
CONRAD Why don't I just trade you cameras?
That's probably the smart way.
BEAN All right.
Hey would you lift mine off when you are through.
CONRAD Sure will.
BEAN I can't pull those things around.
They tend to (garble) around a little better or something
don't they?
CONRAD Can you hold that one?
BEAN Hey, that's about to come apart.
CONRAD I'll be darn if it isn't. I'm fixing
to hold the handle there. (garble)
BEAN It did come apart. It did come apart.
CONRAD Son of a gun.
BEAN Well that kind of (garble). I tell
you what. The only thing -
CONRAD It just broke½
BEAN Sure did break.
CONRAD I'll tell you what happened, Houston.
The nut that holds the handle of the camera on broke. So
the handles is free, but that's okay, we're going to carry it
around.
BEAN Let me ask you a question?
CAPCOM Roger. Got you. We understand that
the nut broke, but you - the camera is still useful, right?
BEAN Yes. Your nut's is loose too, Pete.

BEAN Stay there. Let me tighten it up for
you.

CONRAD Think they work loose?

BEAN 1/6 G yet, we knew that.

CONRAD That's the way it should be, right?

BEAN Can you do that yourself? Cause
it's hard for me to do.

CONRAD Yes.

BEAN Let me go put the camera up and
this camera somewhere and I'll be right back.
There goes the bracket, but that's okay. I've still got
the camera.

END OF TAPE

BEAN looking after that yourself.
CONRAD It's hard for me to do that.
BEAN Let me go put the camera up somewhere and
be right back. There goes the bracket but that's
okay.
CONRAD What about the camera?
CONRAD I'm going to have to help you get this camera
off.
BEAN (garble) There's no need to get it off now.
CONRAD Okay, I'll leave it on. No, I want to give
it to you.
BEAN And you're going to use this?
CONRAD Al, you got to take the Surveyor pictures so
why don't I give you the camera?
BEAN Okay, that's good enough.
CONRAD I just drew about 50 pictures or so. Now
watch it. Make sure it takes a picture each time I turn.
BEAN Okay.
CONRAD And just - why don't you hold the camera - I tell
you what - well, here, I'll hold it and you take this one
off.
BEAN Okay, you got that camera. Take this one off
(garble) Take it off now and tighten them up. And I'm
going to tap it down a little bit.
CONRAD Okay, and I'll hold that down.
BEAN There you go. Push yours down a little bit
more.
CONRAD I'm trying to.
BEAN A bit more. It's almost off, Pete. Pete,
(garble). Push down some more.
CONRAD I can't. There you go.
BEAN Okay, now. I'm tightening it. Now, I'm
tightening a little bit tight. Okay. I got enough. Now
that'll be enough. Now about right there.
CONRAD All right. Drop that one in here.
BEAN Well. Roger.
CONRAD I don't want to carry it.
BEAN That's what I'd do. Carry it or something.
CONRAD But, I got too much other stuff.
BEAN Well, let me carry part of it or something.
CONRAD Okay, let me go pull off the core tube. No,
I tell you what. We can always take the magazine off and
put it on the other one.
BEAN That's what we can do. Okay.
CONRAD Now, we just drop it in here.
BEAN Okay.
CONRAD All right. Let's go get your core tube. I'll
go get it.
BEAN Okay, you go get it. (garble)

CONRAD You left the cap off.
BEAN Take the cap right here.
CONRAD Okay. Hey, you sure beat on it.
BEAN What it took to get it in the ground.
CONRAD It's coming up real easy.
BEAN Right.
CONRAD At least it was coming up real easy.
BEAN Looked for a minute like you were going down
real easy. Core tube hangs in and your feet just sink down.
CONRAD Okay. All right. (garble) Hey, we made a
tactical error here.
BEAN In what fashion?
CONRAD I think we dropped an end of the tube we should
have (garble).
BEAN Uh hunh.
CONRAD Yes. We got to take up a part. Remember?
BEAN Okay, well, what we'll have to do is pick it
up right over there.
CONRAD Where is it?
BEAN It's right over here.
CONRAD Okay.
BEAN Well, hold on. We'll find it.
CONRAD Straight back there. It's someplace buried in
the dirt.
BEAN I see it.
CONRAD Right here. Wait a minute. I'll get it with
a - here, you hold the core tube.
BEAN Okay, just a second. Just a second. Okay, I've
got the core tube.
CONRAD I'll start unscrewing it.
BEAN Where's my sample stir? Right there. You got
it, Pete. All right. You got your hose, too. Oh. There you
go.
CONRAD Sure.
BEAN Uh oh.
CONRAD What?
BEAN This ain't going to work here.
CONRAD Why?
BEAN Well, see the - here, wait a minute, reach inside
the core tube. Which goes - there you go. Beautiful. That
down in there. You got it? You got that one? Okay.
CONRAD Yes.
BEAN Boy, I drove a nice core tube in there. Ball
doesn't look any different though from the eye. Halfway down.
Loan me the tweezers a moment.
CONRAD In that cap right there. The cap right there.
BEAN Now.
CONRAD You through?
BEAN (garble)

APOLLO 12 MISSION COMMENTARY 11/19/69 CST 23:52 GET 133:30 396/3

CONRAD

Ohh. Can you hold the camera here?

BEAN

Sure, I can. Why don't I just set this down?

CONRAD

Well, hand me the shovel and we can get that

in a minute.

BEAN

Okay. You got it?

CONRAD

Okay. Can't we get it closer?

BEAN

Now, wait a - wait. Hold it right there.

END OF TAPE

BEAN No we didn't, mate. Hold it right there.
CONRAD Okay.
CONRAD That a boy.
BEAN Okay. Let her go.
CONRAD Good show there, brother.
BEAN Let me hold on to that thing. (garbled)
CONRAD Okay.
BEAN You got her?
BEAN Is it on there tight enough?
CONRAD Yes.
BEAN Okay. Put the shovel back on here. Okay.
Looks good, Pete.
CAPCOM Pete, we copy that you finished the core
tube. Is that affirm?
CONRAD Yes sir. We got a double core tube and
all put together (garbled)
CAPCOM Very good. Well done. Have you gotten
the panarama?
CONRAD No. I'm going to get Al to do that right
now. He's using my camera. His camera's had it. With the
handle off if and everything by the time we got done handling
it, we got dirt all over the lens. We run out of film, we
happen to have another magazine with us. change that one - -
BEAN Just take that one off.
CONRAD Or we could do that or - -
BEAN Of course, we don't want to, but if we have
to I guess we can. Okay. Let me start this pan.
CONRAD 74.
BEAN 74 it is. Just a minute.
CONRAD 215.
BEAN Okay.
CONRAD Okay, Houston. What else would you like
here?
CAPCOM Okay, Pete. You're 2 hours and 7 minutes
into the EVA. And we show you leaving Halo at around 2:15.
And now that's for a 4 hour EVA. We extended you 30 minutes
for a total EVA of 4 hours. We'd like before you go on, to
have a good EMU check and sit down and regroup that will
figure out a plan of attack on the Surveyor. One think we
would like to make sure is that you remain away from directly
below the Surveyor as you move up to it. That is, move up
to on one side of or the other, either north or south.
CONRAD Okay. We concurred with that. We were
talking about it last night. We're going to approach it
from the side.
CAPCOM Roger.
BEAN That's it, Pete. Pan's complete.

CONRAD Probably ought to get out from under these
rocks here just throw it anywhere.
BEAN Yes. I think we ought to.
CONRAD How about it? You want to get this one?
BEAN Save one of them for a sample bag.
CONRAD Let's sample a couple of these laying right
over here.
BEAN Good idea.
CONRAD That a boy.
BEAN Oh wow, my ears just came back down.
CONRAD Just a second.
BEAN I shouldn't have done that. Okay.
CONRAD Here, take one quick picture so we can
finish the film.
BEAN All right. Here it goes.
CONRAD (garbled)
BEAN Those little holders for this - these
sample bags are ridiculous, you know. In this light gravity
up here, if you put anything in the holder and move, it flips
it right out of it. Come out of these sample bag. There
you go.
CONRAD (garbled)
BEAN Go in there. Go in - that a boy. Give
me some of that dirt around there too, Pete. Drop it right
in. This is going in sample bag 13D, Houston.
CAPCOM Roger, Al.
CONRAD Let's move up on the rim of the Surveyor
Crater and start getting some rocks and (garbled) - -
BEAN Okay.
CONRAD Then we'll turn around.
BEAN Go.
CAPCOM Al, could we have some sample bag numbers
while you're working along there?
BEAN Sure could. Didn't I call out 13D, Houston?
Maybe I didn't call it out - -

END OF TAPE

CONRAD Sure could. Didn't I call that 13B Houston? Maybe I didn't call it out loud enough. I think it was 13B. I will check the next one and the next time we stop, I will tell you the next one for sure and then you will know what it is.

CAPCOM Roger, Thank you, Al.

CONRAD Al, look at these rocks, they look a little bit different.

BEAN Let's grab some.

CONRAD Yes sir.

CONRAD Look at the glass in the bottom of that one.

CONRAD They look like granites, don't they?

BEAN They do, they look just like granite.

BEAN Here's a beauty. Here's a beauty.

CONRAD Where?

BEAN Right here.

CONRAD Hey, that's a nice rock.

CONRAD Right around here.

BEAN Let's get this one. Right there.

CONRAD Okay.

BEAN It's in the bag, but it is sure different. It seems to have some -

CONRAD Got a big glass splotch on it.

BEAN Yea. That's a good one. That's a real good rock.

CONRAD Wait. Wait. Wait.

BEAN Okay.

BEAN That's beautiful.

BEAN That gnomon doesn't really dampen as fast as it should you know Pete.

BEAN I think it does great in 1 G, but one sixth G, doesn't seem to damp right. (garble) cross sun too.

BEAN Oops, got to get over where you are.

CONRAD Okay.

BEAN Okay, we will just put that in, that's a beautiful rock.

BEAN Be able to scoop it up. You know you need some tongs that will get bigger samples than we have got.

CONRAD What's that?

CONRAD You know seeing that, I just thought -

BEAN Hey, that's beautiful. It's got a lot of -

CONRAD Nearly dropped it.

BEAN Got to hold it.

CONRAD Okay, now I want some of these granites over here - looks like granite.

BEAN Okay.

BEAN Let's try that.
CONRAD Doesn't that LM look neat, sitting
on the other side of that crater?
BEAN Yea, it does, we ought to get a shot
of that.
CONRAD Yea.
BEAN Get a shot of home.
BEAN Okay, let me see, how many shots have
I got now, Pete?
CONRAD 143. 143. You ought to be getting
close to the end with it. Okay, that is 14B Houston, is
the next sample bag, so the last one was 13B. (garble)
CAPCOM Roger, we copy that.
CONRAD Al, why don't you step across over
here?
BEAN Alright.
CONRAD Step across over there, near that
rock right there, when we drop the gnomon in and do it
in such a manner as to get this crater that it came out
of.
BEAN Okay, that's a good idea.
BEAN Let me see if I can, let me get a
15 foot shot.
CONRAD Yea, that's what I was just thinking.
CAPCOM Pete, could we have your present
position?
CONRAD Roger, we are - if you were looking
at the Surveyor crater and West with 12 o'clock. We are
at 9 o'clock position with the Surveyor crater.
CAPCOM Okay, Pete. Roger, copy that.
Copy, you are right on the rim and we would like to get
a good EMU check and a rest here before you proceed.
BEAN That's a good idea.
CONRAD Okay, Houston, that's a good idea
and what we are gonna do is - -
BEAN Wait. Wait Pete. I've got an idea.
CONRAD What?
BEAN Pete let me reach back here and
grab this strap. Okay, now go. Okay let me move a little
bit over. That a boy.
CONRAD Backup.
BEAN Now if they had a strap like that
they could just hold the other guy while he leaned over and
picked up a rock.
CONRAD Hey, that works pretty good.
BEAN Sure saves time.
CONRAD Look at the sheer face on that
rock, something whistled by it or something.
BEAN It has some pretty interesting
sculpture marks on it, it also has got some abrasion marks

BEAN on it. Maybe that is just hard packed dirt. Boy there is a lot of flashing crystals in that rock. (garble)

CONRAD It's a good rock.

CONRAD Listen, I'll tell you what I recommend we do while we are taking a break.

BEAN Okay, let me take a picture of that where the rock was. Right there.

CONRAD What I recommend we do is change film packs.

BEAN Alright that's a good idea.

END OF TAPE.

BEAN We'll do that next.
CONRAD Okay. I don't know how you - okay, I'll
get this camera out -
BEAN Stay right there just a second.
CONRAD Shoot a good - shoot a pan and get the
surveyor - use up that film.
BEAN Hey, that's good. I didn't - that
ought to be good. Ah, it's a bad place to shoot but I'll
try it there.
CONRAD Now I think we can do is walk down here
about 300 feet and walk straight down that slope to it.
BEAN I do too. It doesn't look so bad from
here does it, Pete?
CONRAD Un uh.
CAPCOM Pete will the direction of your travel
be to the northeast direction?
CONRAD Now what we do is go directly east and
then walk directly short of course you know, curving right
around and down to it.
CAPCOM Roger. Copy. You'll be going directly
east and then curving around going up north towards the
surveyor.
CONRAD Yeah, you can get a - you get sort of
an optical illusion depending on where you're standing.
BEAN Trade me one. Trade me magazines.
CONRAD Okay, wait a minute.
BEAN Careful when you undo it.
CONRAD I'll tell you what. You better put
that one in.
BEAN No, we want the dark.
CONRAD Okay.
BEAN I want to put it back on here, Pete.
CONRAD All right. I'll try.
BEAN I don't think it makes any difference.
We just put it in here. You're right.
CONRAD Right.
BEAN Just put it right in there with the
rocks.
CONRAD Yeah. It looks pretty to me. Hold
the cameras to the -
BEAN Wait a minute.
CONRAD Okay, go.
BEAN Boy, these cameras got dirty didn't they?
CONRAD Yeah.
CAPCOM Pete, a reminder on that film pack.
Cycle one frame before you start.
CONRAD Roger. We cycled one before we took
it out there. I think we're in good shape Houston.
BEAN I think we've practiced this a few times.

CONRAD I tell you what. Why don't you let me hold it for you? Okay.

BEAN Just a second. Here, I'll stow what you need to do. Pull this out of the way. The lock is what's driving me buggy. Wait. Hold the camera. There. Okay. (garbled) Hold the camera.

CONRAD Okay. Got it.

BEAN Garbled.

CONRAD I said you got it, we got it. Good show, Don.

BEAN Wait a minute, wait a minute. Keep the trigger pulled. Trigger pulled. Let her go. Now try it again. Try it again. That's it babe. (garbled) Okay, let me put it on.

CONRAD ll good and clean, too.

BEAN Okay. Hope we didn't get anything on the resole lens inside. I bet we got some dust on it. Where am I? Okay. Great. Got here on there. There you go.

CONRAD Okay. Let's wander over here.

BEAN Yeah, I think a strap or something like that for each of you so that if you want to lean over and pick up a rock the other guy just holds the strap. You lean over and pick up the rock and go. Get some bigger sample bags.

BEAN Hey, Pete, why don't I?

CAPCOM Good thought Al.

CONRAD What do you want?

BEAN I was going to say as long as we're going.

CONRAD We're moving on, Houston.

BEAN Yeah, a few minutes ago Pete wanted to pick up a rock so I held onto a - that strap of the surveyor bag and he leaned right over and picked it up and I helped him get back up. It's not that you're heavy or anything it's the fact that you don't - you have such poor balance.

CONRAD Look at that glass.

CAPCOM Pete and Al, Houston. Before you go much further, could you stop and have a little break there before you proceed on down the slope?

BEAN Yeah, we're just going to move to the area -

END OF TAPE

BEAN (garble)
CONRAD Yea, we are just going to move to the area, where we could stop and case the joint.
CONRAD Al, grab a shot of that beaded glass there and we will bag it.
BEAN Okay.
CONRAD That's better then a diamond.
BEAN Fill her up.
CONRAD Better take that.
CONRAD There you are.
BEAN Okay, I got it, Pete.
CONRAD Got it?
BEAN Get a lot of these.
CONRAD Got too many of them.
BEAN Oh you did get a lot of these?
CONRAD Yea, why don't you put that good looking rock with it?
BEAN Okay, get some rocks with it. That's a good idea. Hey, here's some rocks right here.
CONRAD Take a big rock.
BEAN You know, we are collecting a lot of the same type of rocks, but there just doesn't seem to be any other kinds around.
CONRAD I haven't seen any microbreccia the whole day, I've looked around for it. All I have seen is the (garble) I have seen nothing that specular at all, except on the surface.
CONRAD I haven't either.
BEAN You know that's real strange, this is not at all like Neil's run.
CAPCOM Roger, we copy those comments. Pete, now we show you are 2 plus 23 into the EVA and based on a 4 hour EVA you would be leaving the Surveyor at 2 plus 50. But don't rush, we would like to make sure you get a good rest before you go into it.
CONRAD Okay.
BEAN Why don't you give me a rock or 2 Pete and I will stick in there.
CONRAD (garble)
BEAN Hey, you throw a good rock.
CONRAD Good rock.
BEAN We're both (garble)
BEAN Okay, that will hit.
CONRAD We just made a sample of a glass beads and some local rock on the South edge of the Surveyor crater, Houston. And they are going into bag 14D.
CAPCOM 14D
CONRAD After all of our training, I'm trying to remember who the guy was who kept - whatever you do don't get dust on the gnomon. Laughter.

CONRAD Okay, we are going to go on the air for a little bit Houston. And get a little bit closer to the Surveyor and look it over.

BEAN Hey, that's coming in from the South, looks like a good way, Pete.

CONRAD I'll tell you what I'm gonna do, Al. I am just gonna loaf right around here.

BEAN That's what I mean, if you stay at this level, you'll end up at the Surveyor.

CONRAD Your right.

BEAN Follow the contour lines.

CONRAD No problem at all, Houston.

BEAN Look at this scoop sticking out. I didn't even see that before.

CAPCOM Pete and Al, could you give us a comment on how far your sinking in?

CONRAD Not sinking in very far at all, this is fairly firm stuff and I doubt if the crater is about the same distance down that Surveyor is.

BEAN I am just going around it radially.

CONRAD Wouldn't you say so, Al?

BEAN Yea, I would say that - I think so. Houston is just as concerned about us getting out of this crater. We been thinking about it too Houston.

CONRAD Now don't worry about it Houston, because it is really no strain, I'm 200 feet away from it I am at the same level, the ground is firm and I can go right back up the way I came in. There's no strain at all.

BEAN That's right.

CAPCOM Roger, sounds good.

BEAN It was last night, when we were talking about it.

CONRAD I'll tell you what let's do.

CONRAD Let's sit right over here and we will park all of our gear and we will take ourselves a little rest, go over you photo plan and then we will have it.

CONRAD I will tell you what, why don't you get a photograph of it right now?

BEAN This is a good place, Okay, will do.

CONRAD Try to see which way it landed.

CAPCOM Okay, Pete and Al when you are looking at it there, would you also try to determine whether there is any effect from the dust during the descen?. That is could you determine whether there is more dust on either the West or the East side of any of the bays and the North or the South side of the camera?

CONRAD Okay, we sure will. I actually flew around it, however I probably passed closer to it then I am parked to it right now. No that's not really

CONRAD true. I'll tell you the way that dust was going, it probably went right - - -

END OF TAPE.

CONRAD I'll tell you the way that dust was going it probably went right over top of us.

BEAN Yes, that's right. Any dust you had on the edge would never go down to this crater.

CONRAD Yes. That's good volume, Al.

BEAN I don't know. How does - It sounds good to me. Are you just -

CAPCOM We read you both loud and clear.

BEAN We're talking loud enough.

CONRAD Okay. No problem.

BEAN I'm going to load you up here just a little, Pete, without any tools. Don't you think it's pretty easy?

CONRAD Look, I'll tell you what. Let's leave the whole - I tell you what - let's take the tool carrier with us.

BEAN Yes.

CONRAD I can just go right up the other rim and around to -

BEAN Sure.

CONRAD (garble) baby there and we could get set right over there at that big crater.

BEAN Well, (garble) take the belt off.

CONRAD Just take it back to the LM.

BEAN Turn it down.

CONRAD I could have landed the LM at the bottom of that crater. It would have scared me to death, but -

BEAN Let's see. Okay, Pete, why don't - would you carry the hand tool carrier down there?

CONRAD Whoop.

BEAN And let me take some pictures up here around it?

CONRAD Okay.

BEAN Now look. You can see which way they came in. See the way the fuel pads dug in over there - dug up dirt? It's still sitting there. This is going to make a good shot. We're not supposed to take pictures during the night. We'll have to do it though. Beautiful. Beautiful sight.

CONRAD You know, this one's brown and I don't remember seeing brown there at the Cape. Kind of a light tan and maybe that - maybe that's the way it's changed color. What color was this one, Houston? White? When it started out?

CAPCOM Stand by on that.

CONRAD It looks a light tan now.

BEAN Hey, this crater isn't as steep as we thought, Pete.

CONRAD Huh uh. And I'd better be careful. I'm going to get dust on it. Yes.

BEAN (garble)
CAPCOM Al, the equipment bays were white on the side and the scoop itself was a light blue.
BEAN Well, it's kind of a - well, we'll get down there and get a closer inspection. What was the general color of all the structure? For example, all the struts and the like?
CAPCOM That's all white. The equipment bays and the primary structure was all painted with a white paint.
BEAN Maybe it turned tan or something. I'll have to look at it more closely.
CONRAD Yes, that's what happened.
BEAN It changed color, huh?
CONRAD Sure has.
BEAN (garble) light brown. (garble)
CONRAD You know, it's funny. On the slopes here it's just a little bit softer. There's no tendency to slip down or anything like that.
BEAN I know.
CONRAD I don't think it's any deeper. A little softer maybe. Maybe a little deeper.
BEAN I'm going to move this down here just a little bit closer, Pete. Let me take the rest down here where we can see it better.
CONRAD Okay, well, just make sure we don't get any dirt down there on it.
BEAN Okay, we'll walk real soft.
CONRAD Hey, you can see - Look there where I dug those scoops.
BEAN You can still see that - Boy, that's going to make some beautiful pictures on the way up there's just - a second.
CONRAD That looks like (garble) long time ago. That's going to be good.
BEAN Oh, that is interesting. Look at how it's kind of made them into - well, it looks like it rained on it. It's taken on a little (garble) from us.
CONRAD Oh, no. I don't think so.
BEAN As you noticed, there's a general hand of lines along here from the north - it might not be the north - east or the southwest - see those little lines running along through the crater here?
CONRAD Yes.
BEAN I think I'll take a picture of that. Boy, this thing is dusty. (garble) Yes, this has those lineal patterns here, Houston. Right down inside the crater, but they're not laying at all in the same direction - I mean, it's not from us - not from the LM.
CONRAD Huh uh.

APOLLO 12 MISSION COMMENTARY 11/20/69 CST 00:17 GET 133:55 401/3

CAPCOM

Roger.

CONRAD

I tell you what - Hey, Al, did you get a picture right across there?

BEAN

Yes, I did, Pete.

CONRAD

this together.

Why don't - why don't you go ahead and put

BEAN

Okay. There's your tongs while you're there.

CONRAD

Just a second. I'll get back to you.

END OF TAPE

BEAN When I get back to you. A place to rest.
I may not - -
CONRAD Is that the way that thing goes?
BEAN Yes. Would you hold one end of it? There
you go. There you go. I think that's it.
PAO Surveyor landed April 19, 1967.
BEAN Pete, could you hold that a minute.
CONRAD Wait just a second.
BEAN What are you trying to get?
CONRAD (garbled)
CONRAD Now I can hold it. What do you want me
to hold?
BEAN Hold that camera for a second. Got it?
CONRAD Why don't we just throw that camera away?
BEAN Well, I was thinking of that earlier and
decided that since this one broke we might have to put that
one on. (garbled) the reliability.
CONRAD Better not scrape it.
BEAN Makes you kind of mad.
CONRAD Huh?
BEAN You look down there just once more.
CONRAD (garbled)
BEAN There you go.
CONRAD That a boy.
BEAN Look and see.
CONRAD Yes. I'm holding it with this (garbled)
CONRAD Wait a minute. What's in your bag, here?
BEAN That other film magazine.
CONRAD Yes.
BEAN Let me borrow your little (garbled) in your
(garbled).
CONRAD Move that handle and throw it away.
BEAN Okay. That's a good idea.
CONRAD Get that junk out of here we don't need.
BEAN Turn this in.
BEAN Bah. Had it.
CONRAD Huh?
BEAN Forget it.
CONRAD I'll tell you what. Why don't you mosey
down there and start taking some photographs?
BEAN That's a good idea. Bet you got checklist here.
CONRAD Sure.
BEAN Okay. The first thing is photo bay A.
CONRAD 11, 15 feet, 1 picture.
BEAN 015, let me get it checked. 11, - -

END OF TAPE

BEAN Okay, let me get it checked. 15, boy
that's turned just kind of a light tan hasn't it Pete?
CONRAD It sure has.
BEAN Some of the things are even a dark
brown.
CONRAD Now, you're closer than 15. Don't
go any closer.
BEAN Yeah. Maybe I'd better back up a -
CONRAD That a boy.
BEAN How's that?
CONRAD That's -
CAPCOM Hey Pete, do you think there's a chance
you're at the wrong surveyor?
CONRAD No sir. Boy, it sure dug in the ground
didn't it? Oh, look at those pad marks. They're still there.
BEAN Still waffle imprints on it.
CONRAD Okay. What's next?
BEAN Photo TV sector F8 15 3 pictures.
CONRAD Okay. Let me move down.
BEAN Hey, this checklist sure helps do the
job.
CONRAD It sure does.
BEAN Connect Gibson checklist.
CONRAD Okay. Hey look. That dirt's still
on the footpad (garbled) to the CAPCOM.
BEAN Hey, we got a nice brown surveyor here,
Houston. Even the tanks which were -
CONRAD The rays divisor's not so brown but it's
tan.
BEAN The glass is still on the top. Not
a bit of it is fractured.
CONRAD Yep. Amazing.
BEAN Okay. Chablis is gray. Make the
surveyor scene here.
CONRAD I don't want to kick any of this dirt
up because I'd like to get a picture of the patching of
the dirt there.
BEAN Yeah.
CONRAD It's going to be a tough shot.
BEAN That's photo TV vector F8 15 and 3. Now
he'll photo scoop imprints F8 5 2 and stereo.
CONRAD Okay, wait. I'm not finished yet.
BEAN Boy that color chart has sure changed
colors these days.
CONRAD Okay. Let me get a quick shot here.
I'm about (garbled)
BEAN Okay, now I want the foot pad photo
scoop imprints F8 5 feet 2 in stereo. Okay. Those scoop
imprints look different than I imagined.

CONRAD Garbled.
 BEAN In a little bit.
 CONRAD You have to really bend over.
 BEAN No, you can't.
 CONRAD Back up. Where are you shooting, Al?
 BEAN Shooting right there where the shoots
 meet the scopes.
 CONRAD Oh, I'm sorry. Yeah. The next one
 is photo the foot pads 2 prints F8 52 and stereo.
 BEAN Wait just a second and I'll get it.
 CONRAD I'm going to -
 BEAN I know what I'm going to do.
 CONRAD Okay.
 BEAN Okay. I'll get the foot pads now. And
 I'll also get the dirt that's on them. It looks good. Okay,
 what's next Pete?
 CONRAD Disturb surface by the foot pads 2
 area. Okay. Then take photo. FP 2 area F8 5 and stereo.
 CONRAD Okay. Will do. Did it.
 BEAN Hey, that disturbed it all right.
 CONRAD We'll be able to get the rocks that
 the surveyor's on - no strain. Get a bunch. There's one.
 BEAN Okay, next one Pete. Photo (garbled)
 engine bay A. F11, 5 feet, 1 picture.
 CONRAD Okay. Garbled - a little bit to the
 (Garbled).
 BEAN Looks pretty good. The engine is still
 green. In fact, that green seems to have had less change
 than most of the rest. Okay, Pete. That's complete. Photo
 large box A, F8, 5 feet, 1 picture.
 CONRAD Okay.
 BEAN Say that again, now.
 CONRAD I was checking something else real quick.
 BEAN Okay. The big box.
 CONRAD Okay.
 BEAN At 5 feet.
 CONRAD 5 feet.
 BEAN F8.
 CONRAD Good. Able to -
 BEAN Okay now, be careful about the glass.
 CONRAD Okay.
 BEAN And then they want you to smoke that
 oven carefully and photo wipe and then photo the - now be
 careful. Let me look and see what it looks like.
 BEAN It seems like not a bit of this glass
 is cracked. One little piece down here looks like it no longer
 reflects but other than that it's in perfect condition. A
 little warped. The seggrant's warped but other than that it
 looks pretty much the same. The thing that's the most amazing

APOLLO 12 MISSION COMMENTARY, 11/20/69, CST 0027, GET 134:05 403/3

CBEAN

Is how it's turned so brown.

CAPCOM

Roger, we copy that, Al.

BEAN

If I wipe it with my - I'm going to
wipe it but not with my glove. I'm going to wipe it with
this little cloth that protects my wrist ring. It doesn't
have any structural thing - anything structurally associated
with it.

END OF TAPE

BEAN - have a structural - anything structural associated with it.

CONRAD It wipes off, just like you'd expect us to wipe off glass.

BEAN (garble) a couple of spots. It's going to be tough to show this, Pete. It's in a shadow. Here we go, though.

CONRAD I don't think the pictures are going to show you much, Houston. Because it's - well, we'll give it a go, but they're better than no pictures at all.

BEAN That's right. Exactly right.

BEAN Okay. Got it there, Pete. Ready for the next one.

CONRAD Okay. Photo small box F 85-1.-

BEAN Okay. Now that's in pretty much of a shadow. I'm going to open it up a little bit.

CONRAD That's my shadow.

BEAN No, it's not. It's either the shadow of the landing radar or the -

CONRAD I think you ought to photo that scoop there, the way it's dug in.

BEAN I did. There's no way that thing can slide down the hill on us the way it's dug in. Okay. Let me get that foot pad. That's a beautiful shot there. We're going to do foot pad 3, I guess it is or is that 1.

CONRAD That's 3.

BEAN Okay. And that's going to be in F 80, probably. No, let me try 56.

CONRAD That AFT honey comb shock absorber struck the dirt and looks like it took some of the shock. Oddly enough, the front one didn't appear to do that.

BEAN (garble) Sure isn't going to slide down the hill though, that's for sure. Okay, Pete. What's next? Back up 15 feet. Take it.

CONRAD (garble) 11151.

BEAN That'll be a tough shot, because it's in the sun, but I'll get ready to go. Get over here. It might hapen. Back up a little bit more. Back up for 15 feet, Pete. Your more than 15, Okay? Now your good.

CONRAD Okay.

CONRAD Your pointing too high.

BEAN I know it. I'm trying to shoot the top of the other (garble). Give me a few extras.

CONRAD Okay. Go ahead.

BEAN Okay. Photo 4 (garble), he's got photo foot pad 3. Look at some of the rays. They're not blue anymore, they're black.

CONRAD Say, how did you do that? Let me try

CONRAD it from here.
BEAN Let's switch this over to ray setting.
CONRAD 5.6, 15 feet, 1 photo.
BEAN Right on track. Okay, shot. Okay, move
around to the front.
CONRAD Excellent.
BEAN Photo footpad, 3. F11, 5 feet, 1
photo. All right, got it in site. It dug in real well too. It's
probably, it's right back where it dug in right to the top
of the -
CONRAD And another thing, we're going to
photo is the scoop trenches F80, 5 feet at 2.
BEAN Okay.
CONRAD There's your (garble)
BEAN Hey, let me get the top of this
little instrument box, because the, cause the (garble) is
fractured there. Interestingly enough, because -
see up the hill here. See there is where it hit. See.
CONRAD Is that your warning tone or something
else? Is that your water tone or something else?
BEAN No. Nothing that I know of.
CONRAD That's the noise again, that we had
yesterday, remember?
BEAN Okay. Now it's time to photograph
the trenches, right?
CONRAD Yes. Okay
BEAN Hey, this is so much easier working
around than in 1G in our practice, it's unbelievable.
BEAN Pete, can you move. Your shadowing
the situation.
CAPCOM Roger, Pete. Good way to have it.
BEAN Is it 5 feet?
CONRAD (garble)
BEAN 5 feet or 15 feet?
CONRAD What are you photoing now?
BEAN The trenches.
Photo the scoop trenches at 5 feet, F8 in stereo.
Watch it now, you're going to get dust on us.
CONRAD I'm watching real close.
Now, your farther than 5 feet.
BEAN Your right.
CONRAD That a boy.
That's it. Cameras moving all the time, so just forget it.
BEAN Okay. Photo the TV mirror. Okay.
CONRAD Now, the TV mirror is -
BEAN F 85 vector.
CONRAD The TV mirror is brown.
BEAN Yes. It's no longer a mirror. It's
brown, because it's looking at brown, isn't it.

END OF TAPE

BEAN It's no longer a mirror.
 CONRAD No. It's brown because it's looking at
 brown, isn't it?
 BEAN No, it looks - -
 CONRAD See, it's got some coating on it.
 BEAN Yes. It does.
 CONRAD Why don't you stay right there, and I'll
 come in and wipe it?
 BEAN Okay. Come on in and wipe it. Look it
 over close.
 CONRAD See the mechanical components down inside
 it?
 BEAN Yes.
 CONRAD It's just got a fine dust on it.
 BEAN Fine dust on it. Well, I'll be darn. Let
 me get a shot of that, that will be a good - if it's sitting
 right. No, I'm not set right.
 CONRAD You got me five-sixth?
 BEAN No. But (garbled) as 8 IP, oh no, I goofed
 it. I take it again. Hey, get over here, Pete. Get one
 more shot.
 CONRAD Okay.
 BEAN You don't get a chance like this everyday
 now. You should have (garbled).
 CONRAD There you go. Okay? Why didn't you get
 yourself in the photo, too?
 BEAN Okay. Just a second. Back up just a
 little, Pete. Try for 15 feet. Okay. That ought to be
 good. How's that look to you?
 CONRAD Good. Come in just a foot.
 BEAN You got a calibrated (garbled)
 CONRAD Oh, that camera is darn right on the money.
 It's out of focus.
 BEAN Okay.
 CONRAD Okay, Houston. I - I'm jiggling it. The
 Surveyor is firmly planted here. That's no problem. Okay,
 Al. We're ready to start getting a TV camera.
 BEAN Okay.
 CONRAD Now, if you want to do something for me
 first.
 BEAN Yes sir. Okay. I sure will.
 BEAN I'll be darned. Off soft dirt.
 CONRAD Give me a big smile.
 BEAN Okay.
 CONRAD Okay.
 CONRAD Big end back on the front. I'll tell
 you what I'm going to do.
 BEAN Ah.

CONRAD Good. Let's go. Wait a minute. (garbled)
Let's get the tool off my back.
BEAN Yes, just a second. All right, we're going
to have to start moving out.
CONRAD I knew it.
BEAN Okay. Retrieve cutter and can. Okay.
Here we go. Here's the cutter. Hey, this is easier in
one-sixth g. Here comes your cutter, Pete.
CONRAD Okay. You still don't have a cutter. Now,
let me get the can.
BEAN Okay. One cutter. Okay. Looking good.
BEAN Houston, can you hear us okay?
CAPCOM Al, say again.
BEAN Suppose they can't hear us anymore?
CAPCOM Negative, Al. We read you loud and clear.
BEAN Okay.
CONRAD I thought so, but that cable's arranged
a little bit differently from the one we trained on, Al.
BEAN (garbled) ready to capture that cable.
BEAN Yes, ready.
CONRAD Okay.
BEAN This cable here - -
CONRAD It's not a Y cable at all it it?
BEAN No. Well it is a Y cable but it's of
a different manor.
BEAN Here's something else they didn't tell
us either. Look at that.
CONRAD Two extra ones. I'll tell you what. You're
just going to have to get region under - -
BEAN You'll just have to cut it on the other
side.
CONRAD Just wait a second. Let me get in there.
BEAN Drop that in the can. That's the only
piece they're going to get that way.

END OF TAPE

CONRAD I got that in the can, that's the
only piece they are going to get that length.
BEAN (garble)
CONRAD Yea, I'm gonna cut the cable back here
though. Okay.
BEAN Watch it, watch it. You've got (garble)
right there Pete. Give them a couple of pieces.
CONRAD There you go. Alright, back off.
BEAN Okay, you've got to cut this cable
too, Pete.
CONRAD No, it goes around the camera.
BEAN Alright.
CONRAD Oh, no, it doesn't either. Under the
tubes, isn't it?
BEAN Yep.
BEAN And here's a few extra. The other
side of that little hole is - -
CONRAD Yea, I know.
BEAN I got it.
CONRAD Now, you've got it.
CONRAD Boy, did you see that material disintegrate?
That cuts easy.
BEAN Now, which tube did you want to give
me, Pete?
BEAN You want me to hold one of those tubes?
CONRAD Yea.
BEAN Let me get in there close.
BEAN You got to have it?
CONRAD Yea, Okay.
BEAN Go.
CONRAD Got it. No, it's too big.
BEAN Too big?
CONRAD No wait, wait, wait.
CONRAD Okay.
CONRAD I can't hardly put the top on.
BEAN It has been weathered a little bit
in 31 months, hasn't it?
CONRAD Hey, you know.
BEAN Hey, what?
CONRAD I think that antenna is still pointed
right to earth. (garble)
BEAN You ever got it to move?
CONRAD Okay, that's done.
CONRAD Okay, we've got the sample, Houston.
CONRAD (garble) the cable and tube.
BEAN Okay, that's in there good, let me
make sure that is in there tight, Pete.
CONRAD Okay, one shiny tube coming up.
CONRAD Okay, wait a minute. Be around there
in a minute.
CONRAD Look at how all that stuff fractured

CONRAD down on the ground.
BEAN Yea.
CONRAD It looks like some kind of a shiny
mirror, some kind of a thermo coating.
CONRAD I hate to tell you this but (garble)
CONRAD Hey, that's a tougher tube than we
are supposed to have, gang.
BEAN I would say forget that tube and
find another one..
CONRAD I can't. I'm gonna break the tool.
BEAN I know it.
CONRAD That tube we are suppose to collect
on the back, Houston, is just a little bit stronger than
it is supposed to be.
CAPCOM Roger, we copy.
BEAN How about right here, Pete?
BEAN That's a shiny tube, that would be
a good one if we could cut it.
CONRAD Where?
BEAN Right there.
CONRAD Oh, that's even thicker.
BEAN Yea, I guess it looks it doesn't it?
CONRAD Get the camera.
BEAN Forget the tube.
CONRAD (garble)
BEAN Hey, Pete.
CONRAD Huh?
BEAN Why don't you bang that glass one?
CONRAD Won't even break.
CONRAD That's pretty good glass, Houston.
CONRAD Can't even break it with our - there
you go. Take a peice off and I will collect it and put it
in.
CONRAD Kind of crunches, doesn't it? Hey,
that's not glass.
BEAN I don't know. Ahh, forget it.
BEAN I don't know what it is.
CONRAD That's sure not what we tried out
in Houston.
CONRAD (garble)
BEAN Amazing.
BEAN Let's get over on this side of it.
CONRAD Okay.
BEAN Okay, that will be a good shot.
BEAN I think, just a minute.
CONRAD Come on boy, we got to move.
BEAN Wait a second.
CONRAD Got it. Okay, whip around the other
side and let's get that camera.
BEAN Alright.

CONRAD Wait. You've got to open your bag.
CONRAD Stop.
BEAN I'm not going anywhere.
CONRAD Got to open your bag.
BEAN That looks good. All the parts are
working.

BEAN The parts are working.
CONRAD Okay. Thanks to Joe Roberts this bag's going
to do the job, I think. There. He worked hard on this thing.
BEAN Let me reach down in there and open it up, now.
CONRAD Okay. Yes, it works great. That thing popped
out wide open.
BEAN That's the silver beam. Uh oh.
CONRAD What's the matter?
BEAN Well, it's not - get a little open here.
CONRAD Every second I spent opening it up is worth
about two minutes when you try to put it in the bag. Okay,
I think it's open now.
BEAN Hey, I got a shiny tube for you.
CONRAD Okay. Let me get it. Let me get it.
BEAN You sure do. That's a good one, too.
CONRAD Here. Wait a minute. Watch your hand. Cut.
BEAN There, you want it? Good cut.
CONRAD Good cut.
BEAN There's one, Pete.
CONRAD Okay, two more tubes on that TV camera and
that baby's on. Okay?
BEAN Good.
CONRAD All right. Let's get them.
BEAN That's one.
CONRAD Think we're going to get that one now.
BEAN Okay.
BEAN That's all right. That's good. At least
we got her.
CONRAD Beautiful.
BEAN Turn around. Let me see it.
CONRAD (garble) man.
CONRAD It'll fit right in that sack.
BEAN Hey, is this a little lighter than that one
in Houston?
CONRAD Let's get the scoop while we're at it.
BEAN Okay. I think I can hold that thing with
one hand and open the bag. Get in there. Get it in that bag.
CONRAD There you go.
BEAN In the bag. In the bag.
CONRAD In the bag? Here, wait a second. Here, I've
got to zip it up.
BEAN Good show.
CAPCOM Copy. It's in the bag.
CONRAD It's in the bag.
BEAN Okay, let me get around to the other side.
They're hard to zip. This is one of the hard parts.
CONRAD Okay. Want me to bend over a little bit?
BEAN Yes. I sure would. Okay. And lean back.

BEAN That'll do it. Just like that.
CONRAD Okay.
BEAN Lean over. (garble) do that. Right there.
One more pull and I've got it.
CONRAD Okay. We've got lots of oxygen.
BEAN There.
CONRAD Thank you.
BEAN Okay. Now, let me put the covers down on it.
Before you get that thing dirty, Pete, how about letting me
cut this scoop off?
CONRAD Well, okay, scoop goes right in here.
BEAN Oh, you've got a place for it.
CONRAD Sure. You didn't think you were going to
leave without a scoop, did you?
BEAN No.
CONRAD Okay, grab the scoop.
BEAN There, that's the problem.
CONRAD That's what they said, but -
BEAN Okay, let me -
CONRAD Let me hold it. Maybe you -
BEAN Wait a minute.
CONRAD Wait a minute. Let me - let me help.
BEAN (garble)
CONRAD You got it.
BEAN Broke.
CONRAD That's good.
BEAN Smooth as silk.
CONRAD Start right here. Now, that's right. They
wanted it - No, they wanted it just after that joint. Okay,
right there.
BEAN Okay. Let's cut it. They wanted that joint
if they could get it. Are you at the roof - Now, you're okay.
CONRAD That's it.
BEAN That's it. (garble)
CONRAD Isn't that dirt in it?
BEAN It looks like that original dirt. Okay. Got
an extra sample for you, Houston. The scoop's got dirt in
it.
CAPCOM Well done, troops. Say, when you move out
from there - Well, first of all, we show you 3 hours into the
EVA and you're about 10 minutes behind nominal traverse we
had figured out for a 4 hour EVA. However, your PLSS
consumables are holding out real well, so we suggest you go
on with the nominal traverse. We may want you to cut down
to perhaps just one sample at Blackie crater.
CONRAD Okay, that's what I wanted to do is go to
Blackie crater if you agree -
BEAN Hey, look - look at this, Pete.
CONRAD What?

APOLLO 12 MISSION COMMENTARY 11/20/69 CST 00:47 GET 134:25 407/3

BEAN We thought this thing had changed colors, but I think it's just dust. Look, we rubbed into that battery, and it's getting shiny again. Let me get a shot of that.

CONRAD Okay, go ahead.

BEAN I think that's what - maybe it changed this color from all that red dust.

CAPCOM Okay, Pete. Now, before you leave there, also, would you get some of those GM samples which we've discussed as well as some of the loose soil from that area?

END OF TAPE

CAPCOM Okay. Pete and Al, before you leave there, also, would you get some of those geo samples which we've discussed as well as some of the loose soil from that area?

BEAN Will do for right now.

CONRAD Okay. Looks good.

BEAN Here's this rock right here. Let me give the surveyor 2 (garbled). You -

CONRAD Okay.

BEAN We don't need them for anything do we?

CONRAD Houston, we don't need these surveying tool anymore do we?

CAPCOM If you've got the TV back at the LM all ready turned off, then there is no more need for it.

CONRAD Okay.

BEAN Okay.

CONRAD That LM - that TV (both talking at once)

CONRAD Okay. Al, have I got my scoop on? Do you?

BEAN You've got your bag full of rock's right here.

CONRAD Okay. Let me go get the sample bags.

BEAN Hey, that's a good one.

CONRAD I don't think the TV could see that one it was too close. How about this one?

BEAN Hook it down with you.

CONRAD Okay. All right, now. Trying to remember where that - they got a (garbled).

BEAN Here's a square one. I see one up there right now.

CONRAD Where's the one that had the lines in it?

BEAN I think it's right over there, right up here on the crater - right up there. I'll show you. Looks like-

CAPCOM Pete and Al, Houston. Before you leave the area of the surveyor, would you take a look back at the surveyor and see whether the direction of the sun light has any effect on the colors which you see?

BEAN Direction of the sunlight?

CONRAD Wait, wait. Let me get this in the bag too.

BEAN Sorry. Didn't know you had it Pete.

CONRAD Okay. Ah no, it's light brown wherever you look at it and up the sun, down the sun or across the sun.

BEAN But strangely enough that light brown rubs off. That's the funny part.

CONRAD Yeah.

BEAN The dirt here is not brown.

CONRAD Is that the rock right there? You know these rocks as they showed in the surveyor pictures all this soil built up around them.

CAPCOM Roger, Pete.
BEAN All the fillets around them.
CONRAD I'm trying to remember where - I can't
(garbled) myself to the pictures, can you?
BEAN No, there's - I think it's
CONRAD Should we nab this one right here?
BEAN That's a good rock right there.
CONRAD I don't know whether I can get that or
not. Let me see.. We'll get it.
BEAN That a boy. There you go.
CONRAD Okay, let's head for Blackie crater.
BEAN Pick up a couple more of these in route.
CONRAD Sounds good to me. Let's get that brick
looking one. I think that's one of them I saw there. Up
the hill a little ways.
CAPCOM Pete and Al, we have comment on what
you just said about brushing up against the battery case.
Would you make sure that anything which you picked up against
that battery case you clean off your EMU.
CONRAD Yeah, we're thinking about that -
BEAN There wasn't any signs of KOH anywhere.
We've looked and -
CONRAD The battery case was tight.
BEAN Nice and tight and brown. Right here's
the one, the square one, Pete.
CAPCOM Roger.
CONRAD Where?
BEAN There.
CONRAD Okay. That's about enough rocks now.
BEAN I think it is, that is, for here. You got
it. Good show. Okay, let's head for Blackie crater.
CONRAD Okay.
CAPCOM Al, do you have a sample bag number on
that last one?
CONRAD All those rocks are too big for sample
bags.
BEAN They are big rocks, Houston. All at
least 6 inches in diameter and I think these are some that
you wanted. It's kind of hard to tell without having a
photograph on hand or something that's standing there and
studying it for a lot longer than I think we care to do it.
It's which rocks are which.
CAPCOM Roger.
BEAN It's pretty easy to move along on this
slope. It's just a little bit deeper and a little bit softer.
I'm going to take a break here, Pete, for just a few seconds.
CONRAD I'm right with you.
BEAN Can't get up your pace when you're running on
the side of a slope. You don't have a chance to go from side
to side like on level ground. Look at that huge boulder out

BEAN there. Boy, I wish we could go over
there. Look at that boulder.
CONRAD Where?
BEAN Straight ahead. See it there?

CONRAD Straight ahead. See there, Allen.
BEAN No, where?
CONRAD Over the top of the hill.
BEAN I don't see where you are looking.
CONRAD Right on the other side of the -
about 200 yards that way. See that big bolder sitting up
there, the biggest one we've seen since we've been here.
BEAN I don't see which one you are referring
to - that one right there.
CONRAD Yea.
BEAN Oh, he's down in everything in that.
CONRAD Look at that right here. Look at
that right there to your left. To your left.
BEAN Let me turn around and look.
CONRAD (garble) is right there.
BEAN There's a big one.
CONRAD What?
BEAN Come further left.
BEAN That's a pretty good sized one.
CONRAD Let's get up out of the crater, where
we can get up on the level ground. Okay.
BEAN Hey Pete.
CONRAD Huh?
BEAN This - there it was kind of hung up
on the - oops let me get the gnomon and pick it up. It's
not usually on there - it won't gnomon. There you go.
CONRAD Okay let's document up a sample here,
and I think you ought to photo that whole (garble) crater
right there. That thing's spectacular.
BEAN It is. What is it?
CONRAD Bed. That's got to be bed rock there,
Babe.
CONRAD Yep. Let's get some samples of that.
CONRAD Got to be.
CONRAD Hey, Houston, is the (garble) craters
right behind the LM? There's a big body impact crater.
CONRAD That made be cool enough back there
(garble)
CONRAD It's tough down the crater, losing
your balance, but it doesn't seem to be, it's just harder
walking that's all.
CAPCOM Pete and Al, could we have EMU check?
CONRAD Sure could. Right at the top of the
rim, we can get a good place to rest. I am reading 36 per
cent oxygen.
BEAN We are Okay.
CONRAD We are gonna sample. I will tell
you what we are gonna do Houston. We're are gonna get
an EMU check then we are gonna pick up one sample here
out of this rocky crater, give you a partial pan, I think

CONRAD this is a pretty fantastically interesting crater with a lot of bed rock. Big chunky rocks blown up out of it (garble)

CONRAD The Double craters on the side of the Surveyor crater and then my recommendation is that we have so much gear and so many rocks, that we head for the LM and start packing it all up.

CAPCOM Roger, we concur that's a good idea. Al, could you give us your per cent?

BEAN I sure could. Looks like about 36 per cent.

CAPCOM Copy. 36 on both and how are you doing on that film?

BEAN That's a good question.

CONRAD Boy, my camera is completely dust covered Houston. I just hope that the LM is (garble) How's the lens?

BEAN Your lens in good shape.

BEAN Why don't you stand right here and get a partial pan while you are resting on this crater, either side.

BEAN Hey, wait a minute. Look at this.

CONRAD What?

BEAN Forget it. I thought I saw something.

CONRAD I'm beginning to think that these rocks aren't (garble) we just crack them open and find they are plain old (garble) You've got to pound one of those things with a hammer.

BEAN Okay, you want me to do a pan of this little part or the whole crater, Pete?

CONRAD No, get the whole crater. Get about 4 shots across it and then move over and get another 4.

BEAN Okey Doke.

BEAN 74.

CONRAD Funny, I can't notice that TV camera on my back. (garble)

BEAN Does it feel okay back there?

CONRAD Feels okay, sure the way to carry gear, sure beats that thing. That's a pain. Wait a minute, where are you shooting, Al?

CONRAD I wanted you to shoot down in that crater right there.

BEAN Sorry, (garble) Okay, you. you

CONRAD Read way down in there, get a stereo on that thing with those big blocks down there.

BEAN Okey doke.

BEAN It's kind of dark, but I think we will get something good.

CONRAD Okay, move over here.

END OF TAPE

BEAN Hope it gets up good. Okay. Move over here. This is probably the most spectacular crater we've come to, I think. The original craters took you down to bedrock than, I guess, more recently than this one. Came in here and really banged it out. These rocks are a lot more sharpened cornered than any we've seen anywhere else. I guess this must be the most recent ones we've been around.

CONRAD No. I got the idea that the bedrock's not too deep and that this was a big crater, but it's very, very, very old. And then this thing came along and hit - -

BEAN That's right.

CONRAD - - and it broke into the side of the bedrock that's been sticking out into this ground and then just threw it out.

BEAN The original threw it all out again.

CONRAD I think - let's get a sample of that rock.

BEAN Yes. Let's do.

CONRAD I think it's going to be the same - -

BEAN And then, let's get out of here.

CONRAD Okay.

CONRAD Want to get a docu - we just documented a couple of the big pieces. How's that?

BEAN Yes. That's a good idea.

CONRAD Let's see. What looks like all the same.

Right here.

BEAN Yes. Let me get a shot at it, Pete.

(garbled)

CONRAD Okay. Get a stereo pair right here. We don't need the (garbled) I'll put the - -

BEAN By the way, when I shot that crater down there, I had my distance set on 30 feet. I thought that would be right but that's the only one we haven't shot on the numbers.

CONRAD Get further back Bean.

CONRAD Okay. Let me get the - -

BEAN Pete, this is going to be sample bag number - number 15D, Houston.

CAPCOM 15D, A1.

BEAN Okay. Pete, you ought to put 2 or 3 rocks in here, just generally, and I'll photograph them and we can see what you took. Couple of more. Those are good. Okay. You know, most of the rocks seem to be exactly like this. (garbled) one of these with a hammer in a minute.

CONRAD Hey, there's some of that light-colored undersoil.

BEAN You're right.

CONRAD Okay. You want me to get another sample bag?

CONRAD No. I want to start moving out.
BEAN Okay. Go.
CONRAD All right.
BEAN Let me pick up this one big rock here, Pete,
and stick it in the bag.
CONRAD Okay.
BEAN Good. That's a good rock.
CONRAD Okay, Houston. Now I'm going to go pack
up the docked samples box and I'll understand you're going
to allow me 20 pounds of other rocks. Is that right?
CAPCOM Pete, what we'd like to do is to get an
estimate from you of how much you think you've got in the
first SRC in terms of volume or weight.
CONRAD Well, in comparison to the zero g air
plane, let's see the maximum load is 80 total pounds, right?
I'm going to guess that the mass that I sent up was about
a 60 pounder. Just the box.
CAPCOM Roger, Pete. From what you said in the
first EVA and basic calculations on Apollo 11 data, we come
up with about 54 pounds.
CONRAD Very good. I think then, we're fairly
close. I just bet you everything we got here is black basalt.
All been colored just like that Surveyor. Hey, that bag
is bouncing a little bit too much back there, Pete.
CONRAD Huh?
BEAN Surveyor bag is bouncing.
CONRAD Well, that's okay. It's not hurting any-
thing.
CONRAD Al, you've got to get that close-up stereo
camera going.
BEAN Okay.
BEAN Okay, Houston. BDR is back in the LM.
CAPCOM Roger, Pete. You're 3 plus 16 into the
EVA, and for a 4 - -

END OF TAPE

CAPCOM Your 3 plus 16 into the EVA and for a 4 hour EVA, your right on.

CONRAD Okay. Very good.

Hey, did you know that our EVA antenna didn't go straight up? It's -

BEAN I noticed that when I was running back. I'll tell you.

CAPCOM Roger. I'll copy. How far off the nominal position was it?

BEAN Looks like it's up to about 65 degrees.

CAPCOM Roger, Al.

BEAN This thing is driving me buggy.

BEAN I think all this stuff is just fine grain Basalt, Pete. We haven't seen anything else, but that. We haven't seen anything at any of the places that we go except the same type of fine grain material. It's been different colors because of how long it's been out on the surface or where it's been. It'll be interesting when we get them to Houston and we can crack them open. Hopefully.

BEAN I want to take a breath here a moment.

CONRAD I used to have to break the legs down in that hand tool carrier, but I don't have to anymore.

BEAN He just pushes his own legs and it and the blocks in there.

BEAN Hey, Houston. Here's where that engine moved some dirt. You can see it here.

CAPCOM Where are you on that, Al?

BEAN I'm right to the left rear of the - it looks like I'm between the plats Y and minus Z strut. And it looks like it really brushed alot of dirt off in this direction.

CONRAD Now look back behind me, Al? (garble)

Need some rocks.

BEAN Get some rocks over here.

CONRAD We can't bolony all day. We've got to get out of here.

CAPCOM We concur, Pete.

BEAN I want you to put the tool - put the tool carrier right here.

CONRAD There it is. Fix your camera in the EGB and you better get the fill can out of there and I'm going to start packing up the geat. Okay, here is the camera. I'm not sure. I guess all this will fit in here, our cameras and everything, complete with this TV camera.

BEAN Okay.

CONRAD Don't lift it up, I don't want my rock box to go.

BEAN Okay.

CONRAD Okay. Do you want to take my batter bag up?

BEAN Okay. Here.
CONRAD Here is the hammer.
BEAN Okay.
CONRAD (garble) Okay.
BEAN Hey, I've got your stereo course up
photos.
CONRAD I'll tell you what you go get me the
solar wind first.
BEAN Solar wind first? I'll go get it
for you.
CONRAD Oh, boy.
BEAN And when we're through, I'll take
that little bag out there with me.
CONRAD There it is right there.
Wait a minute - wait, wait, wait, your all tangled up in the
TV cable. I'll tell you, that TV cable is a big - is really
making me mad. There you go. That - wait, wait, wait,-
let's take the Surveyor. TV camera on.
BEAN Huh?
CONRAD At the foot pad.
BEAN Is that what you want to do with it?
CONRAD Just put it at the foot pad.

END OF TAPE

CONRAD That's what you want to do with it.
BEAN Like you put it in the foot pad.
CONRAD Oh, okay. All right.
BEAN Let me set this down then I'll go get
it. Just a second. Thank you.
CONRAD You're all tangled up again.
BEAN I'll tell you, it's a trap. Okay. Put
this on the bottom one, Pete. It feels better. Go ahead
and turn this way, would you.
CONRAD Okay. (garbled) We're much lighter.
We're not going to have any trouble running this one up the
PC.
BEAN Okay. That's off there.
CONRAD Where'd you put it?
BEAN Right here. Where would you like it?
CONRAD Dump, dump (garbled) REC. Oh boy, I
made a mistake. I should have brought the tool cutter back
with me. This TV cable - just put it in the foot pad - this
TV cable is going to drive me crazy.
BEAN See there. Want me to take and move
it out of the area?
CONRAD I just tried to throw it under the LM
now -
BEAN I can grab one end and just pull it out
if you want. Why don't I do that?
CONRAD It's all tangled on the LEC now. It's
happened every damn time.
BEAN Okay, I'll put this - where do you
want me to put this? Right here.
CONRAD Yeah.
BEAN Right in the foot path.
CONRAD I'm going to straighten this LEC up
right now.
BEAN There you go.
CONRAD When I disappear with the LEC you get
that TV cable and get it out of here.
BEAN Okay. There you go.
CONRAD Now, just throw the TV cable under the
spacecraft.
BEAN Okay. Just a second. There we go.
CONRAD They cost me 10 minutes haven't they.
Okay, I want you to get a solar wind.
BEAN Okay. Let me get this TV cable out of
the way.
CONRAD I'm packing some rocks.
BEAN Pete, would you hold this just one
second? We'll get rid of this cable forever. Pull that.
CONRAD Where do you want me to go with it?
BEAN Just stand right there. Then I can
get this out over here, see. Before that I couldn't.

APOLLO 12 MISSION COMMENTARY, 11/20/69, CST 0112, GET 134:50 412/2

BEAN Now you've only got one place to -
that's right
CONRAD Is that right?
BEAN (garbled) Leave the door (garbled)
CONRAD Okay.
BEAN Tell me when.
CONRAD (garbled).
BEAN This the bag you want me to use Pete?
CONRAD Yeah.
BEAN Okay.

END OF TAPE

CONRAD That window doesn't like to roll up much.
BEAN Little rascal, doesn't want to roll up.
Just wrap it around here best I can. Not getting any dirt
on it. This is really ridiculous. I got dust all over the
rock box and I'm trying to blow it off. You can imagine
that. Okay. We got that solar of wind.
CONRAD Good boy.
BEAN Houston, we got the solar wind, but it didn't
roll up in a very neat package.
CAPCOM Roger, Al. We copy. That's all right.
CONRAD Hey, it sure didn't, did it?
BEAN No. It just didn't. It split right near
the top.
CONRAD Can I help you?
BEAN Yes. You can hold that and I'll just try
to roll it up as best I can without getting any - I already
got a little dirt on it (garbled). You know what I mean?
CONRAD Yes.
BEAN Not a lot I could do about it. I'm sure
(garbled). That thing is fragile.
CONRAD Here, let me hold this end, and you just
wrap it tight. At a boy.
BEAN I'll squeeze it down.
CONRAD At a -
BEAN In case there are any of those - (garbled).
Okay. Got that in there? Looks bad, but I think it will
do the job, Houston. We squashed it in so its - let me
get it in -
CAPCOM Roger, Al.
BEAN Okay. There you go.
BEAN Just doesn't look so good.
CONRAD Give me a hand getting this rock box closed.
BEAN Okay. Will do. Hey that's a nice full box.
That's what I'm afraid, right there in the top of it. Now,
just what we need.
CONRAD I got to get this dirt off it, somehow. Hey,
I know. Reach right in there. There's a brush. (garbled)
BEAN Wait a minute.
CONRAD Oh, why didn't I think of that earlier?
BEAN Got it? Then you can just take a (garbled)
There you go. Good show, Pete.
CAPCOM Pete, that glass brush should be over there
on the hand tool carrier if that will be of use to you.
CONRAD We're using it right now.
CAPCOM Roger.
CONRAD Okay, Al. Put that back in.
BEAN Back in.
CONRAD Now.
BEAN Okay. Okay. Go. Got it made.

BEAN Looks like you did it.
CONRAD Yes. I hope so.
BEAN Okay. Got it, Pete. It looks good. The
Box 2 is closed, Houston.
CONRAD Al, I want all the big ones. That looks
like about 1 inch to me.
BEAN Yes.
CONRAD That's it. The extra bag.
BEAN Pete, you got some of those bedrock ones
in there didn't you?
CONRAD Yes.
BEAN Good show.
CAPCOM Pete, Houston.
BEAN What do you want me to do with that?
CONRAD Well - Yes.
CAPCOM Okay. We'd like to give you a little weight
summary for the rock boxes. If we estimate you probably got
about the same in rock box 2 as you did in rock box 1. No
problem there. The Surveyor parts and TV camera will show
a nominal 25 pound in 15. What you could put in the bag
that goes on the floor is about 15 pounds worth of rocks
and in the left-hand side stowage bag, you can put about
25 pounds of rock. So I guess those are the two you are
working for now. 15 pounds worth of rocks in the bag on
the floor and 25 pounds on the left-hand side stowage bag.

END OF TAPE

CAPCOM to your (garble) for now. 15 pounds worth of rocks in the bag on the floor and 25 pounds on the left hand side storage bag.

BEAN Pete, we don't have that many rocks Houston. I'll tell you what we've got. We got SIC2 is full and closed it's - ah, gosh I hope I've got it all in there, let me see solar wind, core tubes, environment gas sample, documented samples, all made it in, and the box is full and I closed it and I've got about -- what is 1 inch on my scale? Got about 1 inch worth of rock in another bag and that's it. That's all the rocks we've got.

CAPCOM Roger, stand by for that number Pete.

CAPCOM Pete, that 1 inch displacement is about 10 to 15 pounds. No problem, pack it up.

CONRAD Okay. That's good. Okay, now let me ask you another question. I can get some more rocks.

CONRAD I know how to do that. While Al is taking stereo photos. Well, see, if I can get myself - Okay, I'm gonna - I don't have a camera to go along with this, so I will just tell Houston, when I'm taking a picture and then they will know. So they can keep up with it.

BEAN Okay, Houston understood, I'm taking a picture now. About 10 feet from the LM between the plus Y and minus Z strut and I am hoping to show the effects of the engine exhaust on the lunar surface. That was number 800. And we are at 801. It's moving around here pretty good.

BEAN I'm gonna take another one. The little counter doesn't seem to be working. Everything is working okay, but the little counter. And I am taking the fourth picture right up next to the engine here. Okay, another one close to the engine. About 2 feet from the engine. Okay Houston, the little counter on top of the film is not working, so I will just tell you what I take next. And the light and everything seems to be working so I assume it is properly taking pictures. Better go look for a crater that is undisturbed take a picture down inside it.

CAPCOM Roger Al.

BEAN Here's one of a rock. Take 2 of the rock. Now I am taking a picture of Pete's footprint in the soil. Take a look at the interaction of that. Take another one.

CAPCOM Pete, Houston.

CONRAD Yea, go ahead.

CAPCOM Okay, we recommend that you pack up where you are and start trying to pack up the excess rocks you just got and think about ingress.

APOLLO 12, MISSION COMMENTARY, 11/20/69, CST 0122, GET 135:00 414/2

CONRAD Okay, very good. Houston, I would like to comment to all the people who are involved with this EVA, my congratulations.

CAPCOM Well, I think you 2 folks did an excellent job.

BEAN I'll take some of these pictures, so you give me a call, Pete.

CONRAD Why don't you just start working your way over here Al, and we got an awful lot of gear and we will start getting her up.

BEAN Alright, will do.

CONRAD We've got about 22 minutes, by my clock. 23 minutes.

BEAN Alright.

CONRAD Okay and we got a long - - -

END OF TAPE.

BEAN You think so.
CONRAD Back.
BEAN All right.
CONRAD Man, we've got a long day in front of us.
BEAN Okay. Oh, this is so much fun. I can jump
up about 3 feet and do a - about 80. Ain't that good -
360?
CONRAD You got to watch it though. You get all that
sand going around and you get in trouble.
BEAN (garble)
CONRAD What's up with Yankee Clipper this morning,
Houston?
CAPCOM Pete, Yankee Clipper looks real good. He's
been doing P22's and rolling right off.
CONRAD Good.
BEAN Okay, Pete, I think this is my last.
CONRAD Okay, they can see the Surveyor and they've
been able to see us out there?
BEAN Okay, that did it, Pete.
CONRAD All right.
CAPCOM No report on that, Pete.
CONRAD All righty.
BEAN Here's a red one.
CONRAD Got it?
BEAN Okay.
CONRAD Okay, lift her up. Now we -
BEAN I got another in the ETV.
CONRAD Okay.
BEAN There it goes.
CONRAD Okay. Wait. I want to watch.
BEAN Ready?
CONRAD Yes.
BEAN Okay.
CONRAD Okay. Okay.
BEAN I think we got all the film in, didn't we,
Pete?
CONRAD Yes, I tell you what. Let's send the -
BEAN EDMU and okay, clean me and I'll get in there
and we start towing the things because we got quite a load.
CONRAD Yes.
BEAN Now, one thing I need to do is - hand me the
Surveyor - Surveyor bag.
CONRAD Bag.
BEAN (garble)
CONRAD Here you are right here.
BEAN Beating two hooks.
CONRAD That's all of that one.
BEAN All right. That's one. Now the other. Don't
log them. We're going to be logging them anyway. (garble)

BEAN (garble) logging them. We'll just leave well
enough alone.
CONRAD That's right.
BEAN Then things will get jammed. Okay? Is that
it?
CONRAD Yes.
BEAN Okay, put it back on the footpad. Okay?
Not supposed to get too dirty.
CONRAD Okay. Now, let's brush you off.
BEAN Okay.
CONRAD Why don't you hop up on the ladder and let
me brush you off from the ladder.
BEAN Okay, why don't you brush me off. I'm high
here and then I'll hop up and get -
CONRAD Okay. I'm not getting much off.
BEAN Okay.
CONRAD It's a start.
BEAN Let me try you, babe.
CONRAD Okay.
BEAN Oh, that isn't very hard to get off. Let me
get up here.
CONRAD I'm going to kick my feet first so I can get
this sand off right now.
BEAN Dirty.
CONRAD Ow, they're sharp.
BEAN Okay. Let me hit you.
CONRAD All right. Okay. I kicked my shoes.
BEAN (garble) keep at them.
CONRAD I think I may get myself dirtier. Okay.
Boy, I tell you something. These badgers get grimy black.
BEAN Is that it?
CONRAD Yes.
BEAN Okay, I'll go in. (garble)
CONRAD Okay.
CONRAD Okay, I'll watch you in the hatch.
BEAN Okay. Okay, just a second. Just let me get
the door open. (garble) door wide open. You want my (garble)
CONRAD Get in.
BEAN Oh, that's okay.
CONRAD You might want to turn off your PLSS feedwater
when you get all the way in.
BEAN Pretty good thinking. Okay.

END OF TAPE

CONRAD That a boy.
BEAN RN.
That does it.
CONRAD Roll a little left. Yes, that's it.
That's it. Okay, just a second. No rush. Take your time.
BEAN I've got to get secrets coming out
of the wind and I don't want to leave it in here when I'm
in here.
CONRAD Can't we get the picture of the LM
and the Earth?
BEAN Nope.
CONRAD Oh, that's a shame.
BEAN I know it.
CONRAD High up, I can see it, but up over
the left hand is the first time I've had a chance to look.
Your about a quarter Earth.
BEAN Give me a sample bag. Hey, you
got to give me a little slack, Pete.
CONRAD Okay. More?
BEAN Just a second, and I'll be with you.
CONRAD Don't put any weight on it. Can you
hold the weight, wait, wait, wait - Just a second.
There you go.
BEAN Now hold on.
BEAN Wait, wait, wait.
CONRAD There you go.
BEAN (garble) away.
BEAN Okay duke. It's all yours.
BEAN (garble) you just pull in like this.
CONRAD All right. Got it. Hey, Houston,
the Surveyor gear is up, coming back for SRC-2.
CAPCOM Roger, Pete. Copy Surveyor parts
by you.
BEAN Okay, Pete. Take them. Oh, no, not
yet - not yet.
BEAN Not yet - just a second out. Uh oh.
That's okay. That's beautiful. Oh, boy. Okay. Take her.
CONRAD Huh?
BEAN Take it away.
CONRAD The game is don't rush and do it right.
BEAN Here I go get the rock box. Okay.
CONRAD That means there are more in line.
Al, (garble)
BEAN Okay. I've got that much more.
CONRAD Al, that's good.
BEAN You may have it tangled up some, Pete.
CONRAD I see what the problem is. There, it's
on the hatch and ready to go. Okay. lift away, you've got
a rock box.
BEAN Okay.

BEAN It's heavier (garble).
CONRAD Wait a minute, wait.
BEAN Okay.
CONRAD Wait. There you go.
BEAN All right. Now do it.
CONRAD I'm going to have to use the color
feature just a second. All right, ready?
BEAN Go.
CONRAD Give her one big heave.
BEAN Take it.
CONRAD Okay. I can't see it. Gosh darn it.
BEAN Can you take up some tension and we'll
pull it in?
CONRAD Got it. That's it.
CONRAD Box 2 is in, Houston.
CAPCOM Roger. Rock box 2 in.
CONRAD And am I filthy dirty from that LEC;
wow, wow, wow.

END OF TAPE

BEAN Okay Pete, go ahead.
CONRAD Dum, dum de dum dum, Dum de dum dum dum
You didn't get them out of these shadows. You know they
get errie looking. Okay Al, if you'll wait just a minute.
There you go.
BEAN Did you do okay?
CONRAD Coming in.
BEAN Okay, just a second. Passing over the
thing.
BEAN You'd better believe it.
CONRAD I can't see.
BEAN Okay, pull up a little bit and I'll
bring it in.
CONRAD The sun's shinning right in my eyes.
BEAN That's it.
CONRAD In?
BEAN It's in.
CONRAD Beautiful job, just throw the LEC out.
Okay, Houston. ETB is in (garble). He can run all the cells
and so forth and so on.
CAPCOM Roger, Pete. Copy you got the ETB in
with the TV camera close up stereo and the film packs.
BEAN Okay Pete, here comes the LEC's. Watch
out.
CONRAD All right. (laughing) Man, that really
comes out here doesn't it. Gee, they went 50 feet. Okay,
let's see. Have I forgotten anything? Forgotten anything.
CAPCOM Pete, you didn't roger the film pack.
Do you have all the film packs and the close up stereo film
as well as the TV in that ETB?
CONRAD Okay. Close up stereo film was in
the ETB, 2 black and white magazines and one camera. I
threw the other camera away because it was broken. And the
TV camera went up so I believe we've got everything, ED.
CAPCOM Okay. You got the - also the one
camera which had the third film pack on.
CONRAD The third film pack never got used.
BEAN Yeah, it did too, Pete.
CONRAD Oh, did you.
BEAN Yeah.
CONRAD Oh, I'm sorry. Okay, we got 3 film
packs and 1 camera up there right now. How's that?
BEAN Did you send the film pack back up?
CONRAD Yeah.
BEAN Okay, we sent all 3 film packs back up.
BEAN Oh, oh, oh, oh. There is something I
wanted to - that's my low water pressures, Houston. I just
turned off my water. That's good.
CAPCOM Stand by on that, Al. Pete, also how
about the tools?

APOLLO 12 MISSION COMMENTARY, 11/20/69, CST 0137, GET 135:15 417/2

CONRAD Yes sir.
BEAN They want to turn off your water too,
Pete.
CONRAD Yeah, I was sitting here thinking there
was something I ought to do. Mine's off.
BEAN Okay. Out of your way.
CONRAD Okay. Houston, if you can mark me off
the lunar surface, I'm on the foot pad.
CAPCOM Ro -

END OF TAPE

CAPCOM Roger, we got that Pete at 3 hours
and 50 minutes into the EVA.

CONRAD Okay up the ladder I go, High Ho
High Ho, High Ho. Boy, I'll tell you Al, that LEC really
got me dirty.

BEAN Yea, it flipped that dirt all around.

CONRAD High Ho. Oh wait a minute I know
what I want to do.

CONRAD There we go.

BEAN Hey Pete, you want to give me that
piece of paper?

CONRAD I couldn't get it up.

BEAN That's too bad.

CONRAD Okay Houston, that's my PLSS feed
water, no sweat. Head down, come down. That's better.

CAPCOM Roger Pete.

CONRAD Slightly, that's it, come on in.

BEAN Come to your left a little bit. Okay,
it's one up. Little more to the left.

BEAN That's right.

CONRAD Huh?

BEAN Your just right.

CONRAD Scoot in there. Got to kind of scoot

BEAN A little bit further in.

BEAN You got it made.

CONRAD Bump into me now.

BEAN Okay.

CONRAD (garble) Let me close the hatch.

BEAN (garble) rocks out of your way.

CONRAD I wonder where that came from?

BEAN What?

CONRAD That little piece.

CONRAD I think that came from off of the
landing.

CONRAD Roger up Babe, you are nice and clean.

BEAN I think Gordon will be glad to see
you.

CONRAD Got to get the hatch closed.

BEAN Okay, check that for auto ---

CAPCOM Yankee Clipper, Houston.

CONRAD Okay, hatch going up.

BEAN Okay, let me move out of the way.

CONRAD Tell me (garble) Wait a minute.

BEAN Okay.

CONRAD Cabin resealed valve auto. Auto.

BEAN That's right (garble) and master
alarm will come on the cabin warning light. Okay, here
comes the O2. And the pressure is rising. Looks good
right this minute. Okay, that's normal. Turn O2 off.

CONRAD Say again.
BEAN (garble) turn it off when you get
3.(garble)
PAO Cabin is up to 1 pound and a half now.
CONRAD I can't get it Al.
BEAN Just a second let me fix my suit.
CAPCOM 2 pounds.
INTREPID Could you get mine off?
INTREPID Roger, fine. Just a second.
INTREPID (garble)
INTREPID I can't hear you.
CAPCOM Up to 3 pounds.
INTREPID You okay, (garble)
BEAN Everything is off, Pete.
INTREPID And the cabin pressure is - -
INTREPID Cabin 4 pounds.
INTREPID Okay, you want me to turn it off?
CAPCOM 4 pounds.
CONRAD That's it, that's it Babe.
CONRAD (garble) the check list.
BEAN I hope that seal is good.
CONRAD Say Again.
BEAN I didn't check that seal real closely.
CONRAD I didn't either.
CAPCOM Yankee Clipper, Houston.
INTREPID Verify cabin pressure increasing,
(garble) activate OPS third valve to (garble) as required.

END OF TAPE.

INTREPID Now let me tell you
INTREPID (Garble) activate OPS purge valve to depress
suit is returned.
INTREPID Ah, that's better.
INTREPID Hey don't take your helmet off.
INTREPID That's right.
INTREPID Get your gloves.
INTREPID (garbled).
INTREPID Yeah, we do because we have to put on our
other one.
INTREPID Okay.
INTREPID Okay, let me read you.
INTREPID Yeah. Okay, cabin depress valve closes at
44. Here my cabin pressure is stable at 46. Looks good to
me, Pete. Most EVA systems could dig, verify (garble)
look over there and makes your suit there and one is closed.
now make sure that suitband Delta V is closed.
INTREPID Okay, just a second. Suit sam 1 is closed.
INTREPID Suitband Delta P closed.
INTREPID Okay. They're going to get some ECS margin
and H2 is up to (garble).
INTREPID I can't hear you, what?
INTREPID ECS CAUTION and H2O SEP to pull the lights to
go out in a minute.
INTREPID Not your glove.
INTREPID Everything's out.
INTREPID Okay.
INTREPID That H2O valve now open.
INTREPID Okay, that's a good idea boy. Purge valve -
INTREPID Now we don't have anything left but a little
rendezvous. (Ha, ha, ha ha). (Garble).
INTREPID Give me your purge valve setting, I'll put it
in the TSD. Then you can let me do my purge valve. Okay?
INTREPID Got it?
INTREPID My suit stuff has got all that dirt on it so
I guess - is this mine? There you go, Pete.
INTREPID I can't turn it (garble).
INTREPID Sure, sure.
INTREPID Peak of the Purge valve has to rotate
with the other. Got your MN?
INTREPID Let's find it. Let's shake in it.
INTREPID I know. Hey somewhere
INTREPID Is an H2 valve open?
INTREPID Turn it over.
INTREPID Purge valve and OPS O2 rolls still perched
out at TSD.

INTREPID I could throw it in there, I'll find the ball.
 INTREPID Oh, may have thrown it over.
 INTREPID (Garble).
 INTREPID Hey, these things have all come undone.
 INTREPID I think they got a lot of that dust on them.
 INTREPID Here, would you turn this please.
 INTREPID Yes, I sure will. Are you counting.
 INTREPID I don't really feel like counting.
 INTREPID Okay.
 INTREPID We're sticking it.
 INTREPID Got your's REV to REV?
 INTREPID REV to REV all systems REV to REV (garble)
 (garble)
 INTREPID So far we haven't touched one off those circuit
 breakers as far as I can tell, around in here. There are your
 hoses, Pete. Got them.
 INTREPID Yeah. 9 I did okay.
 INTREPID Vector REV 3 to blue isolation both, the suit
 both.
 intrepid Okay, would you turn mine on?
 INTREPID Thank you. Got it.
 INTREPID Does that feel good.
 INTREPID Okay. Let's get to the TIP UP OFF and FAN OFF,
 it's the back pressure in your fan.
 INTREPID Okay, that's good.
 INTREPID Disconnect those H2O's for PGA; connect (garble).
 INTREPID (garble) you did in command. But that draws
 to you a little bit, Pete.
 INTREPID I was sick just a minute ago.
 INTREPID That did it. (Garble).
 INTREPID Okay?
 INTREPID Okay.
 INTREPID LCD pump in.
 INTREPID Okay. We're going to get two of them probably.
 You see them? Test made, both of them O up.
 INTREPID Okay, hello there.. A OFF and B is OFF. ICS
 (garble).
 PAO Intrepid Houston.
 CAPCOM Intrepid hooked up on the - Intrepid system
 how do you read?
 PAO We read you loud and clear Pete and we're
 standing by to give you any help on the stowage you may need,
 and when you get down to earth we also have some good words
 for you on how to stow the TV camera.
 INTREPID Okay, we'll wait for a while. Let us get
 through our checklist, please.
 CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 01:57 GET 135:35:00 420/1

PAO This is Apollo Control at 135 hours, 41 minutes. We will pass on the EVA heart rate and BTU information as soon as it is available. It should be within a few minutes, shouldn't be very long. We copied Al Bean back in the LM at 135 hours, 10 minutes, 4 seconds. Pete Conrad back in the LM at 135 hours, 31 minutes, 53 seconds.

INTREPID Hello, Houston, Intrepid.

CAPCOM Intrepid, Houston, go ahead.

INTREPID Roger. Are we a little bit early, or do you want me to go ahead with the checklist and put on my Rendezvous Radar Outrate Heater Circuit Breaker?

CAPCOM Stand by, Pete.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 02:07, GET 135:45:00 421/1

CAPCOM Pete, we show that you are ahead. You can go ahead and complete that step, and we'll be back with you to - on any items which we would like you to hold on.

INTREPID Okay, very good. I'll go ahead and put that in, and we're going to go ahead with our jettison here shortly.

CAPCOM Roger.

CAPCOM Yankee Clipper, Houston. On the high gain would you give us pitch minus 30, yaw 175?

CLIPPER Hello, Houston, Yankee Clipper.

CAPCOM Yankee Clipper, Houston, go ahead.

CLIPPER Rog, Houston. Looks like 158 is going along real great (garbled).

CAPCOM Real good, Dick.

CLIPPER (garbled). Just to hear something, I'm doing fine.

CAPCOM Roger, copy. You're right on the time-line.

CLIPPER (garbled) REV 28 will be 02 right now before I get a thing. REV 58 is the next REV.

CAPCOM Roger, Dick. We have - we have F 158, REV 28 when you're ready to copy.

CLIPPER Okay, go ahead.

CAPCOM T1, 1372855, T2, 1374055, roll 90228338, T1, 1374911, for daykar, roll 89217319, T1, 1375242, (garbled), roll 621621312, T1, 1380347.

END OF TAPE

CLIPPER Okay, and I put these on 151374855, P2 time is 1374055, Canopus roll 090, pitch 220, yaw 338, P1 is 1374911, Acrux roll 9, pitch 217, yaw 319, P1 1375242, (garbled) roll 62, pitch 162, yaw 312, P1 1380347. Over.

CAPCOM Readback correct, Dick, and we also have map update for REV 28.

CLIPPER Go.

CAPCOM LOS 1363434 1365916 1372047.

CLIPPER Roger, I copied that. Thank you.

CAPCOM Okay, Dick, and we also have one extra thing here. You can observe a transient event. You should take photos and observe Alphonsus at a GET of 136:00:02. You need not change film. You can go with the Hasselblad 80 millimeter lens if you want to take some photos, and you can go with F4 250 at infinity. The transient event, area 7. Your brightening between the central peak and west wall, 110 nautical miles south of track, view is window number 1, and it can be performed in the F158 attitude.

CLIPPER Roger, I copy at 136:00:02, EL Hasselblad, 80 millimeter, F4 in 250, and it's going to be area 7, window 1, 110 south, and say, that is a good place.

CAPCOM Okay, Dick that's a brightening between the central peak and west wall.

CLIPPER Okay, I've got the camera now. I'll take a look at it.

CAPCOM Roger, Dick.

CLIPPER Houston, Clipper.

CAPCOM Clipper, Houston, go ahead.

CLIPPER Roger, is that in the crater Theophilus?

CAPCOM Dick, say again. Would you?

CLIPPER The transient event, is that in the crater Theophilus?

CAPCOM That's in Alphonsus, Dick.

CLIPPER Okay.

CAPCOM Again, Alphonsus and a brightening between the central peak and west wall.

CLIPPER Okay, I've got it.

CLIPPER Houston, this is Clipper. That first pass is complete.

CAPCOM Roger, Clipper, copy complete. What was the visual on that transient event?

CLIPPER I didn't see anything out there except a dark area in between the central peak and the west wall, but

I - -

END OF TAPE

CLIPPER No I didn't see anything up here. There is a dark area in between the central peak and the West wall. I can't tell if it is. But it's a little bit darker than the rest of the surrounding area. That's quite a ways away so I can't see much down there.

CAPCOM Roger.

CLIPPER It's put on the chart that Battery A is going to go off.

CAPCOM Roger, we copy..

CAPCOM Yankee Clipper, you can terminate the charge on Bat A at 137 00 as in the flight plan.

CLIPPER Okay, let's start on B, I guess.

CAPCOM That's affirmative.

INTREPID Okay. Just don't let that get on your clothes.

CAPCOM YANKEE CLIPPER.

CAPCOM Dick, say again.

CLIPPER These launch crewmen asleep.

CAPCOM Dick it sounds good but you're slightly garbled, maybe you could move the mike a bit away from your mouth.

CLIPPER Uh, huh, I just said (garble) to go to sleep.

CAPCOM Roger, we copy that. Say Dick at 140 plus 00 you have a landmark track coming up of 193. It's your option you can go ahead and do 193 or landmark tracking on the LM.

Whichever way you want to go we'll work you up a pass.

CLIPPER Well, which would you prefer?

CAPCOM Oh, it's really your option, Dick. We can work up a PAD either way.

CLIPPER Al, let's use the LM, huh?

INTREPID Okay, we'll give you a PAD to the LM.

CAPCOM Yankee Clipper, Houston.

CLIPPER Go ahead.

CAPCOM Dick, well we need some words on the status of that hatch window in order to help us intrepert the data you're getting back from the 158.

CLIPPER Well it's in a - it's really not too bad - it's got a few drops on the outside yet from that launch stuff that's on there and I've tried to keep the inside clean. It's got some smear marks on the inside pane and we've got to wipe it. It got all wet last night and I tried to dry it off this morning with a towel and kleenex; it's still smeared a little bit (garble) it looks pretty good, really not too bad. I'm cleaning it again right now.

CAPCOM Roger, Dick. Thank you.

INTREPID Hello, Houston, Intrepid.

CAPCOM Intrepid, Houston. Go ahead.

INTREPID Roger, Commanders feed water remaining .32KG.

CAPCOM .32 kilograms. That's right and we'll have the

LMP swing in just a minute.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1361500, CST 0237 424/1

INTREPID Pete said the LMP's water is .26.
CAPCOM .26.
INTREPID That's affirmative.
INTREPID Houston, as soon as we get through our
suit integrity check we will be depressurizing the cabin for the
jettison.
CAPCOM Roger, Intrepid.
CAPCOM Yankee Clipper, Houston. One minute, 1-1/2
minutes till LOS.
CLIPPER Roger. (garble)
CAPCOM Roger, Dick. See you again.
CLIPPER Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0257 GET 136:35 425/1

PAO Repressurization of Intrepid's cabin
is complete now after the jettison. The seismometer people
say they recorded several impacts during this jettisoning
period.
CAPCOM Intrepid, Houston, COMM check.
INTREPID Loud and clear. The equipment has
jettisoned. We are just cleaning up the cockpit. Sorry.
CAPCOM Roger, Pete, we copy 2 impacts on the
PSE during jettison.
INTREPID That's PLSS 1 and PLSS 2.
CAPCOM Roger,
INTREPID They were - as a matter of fact, as
a matter of fact that may help to calibrate that thing because
let me - I got a clean kick on both of them. In other words,
when they left the hatch they departed the hatch and went
free fell all the way to the ground without touching the
ladder or anything on the way.
CAPCOM Okay, they pretty much went straight
out and on a ballistic right on down and hit the ground, didn't
arc up at all.
INTREPID That's right.
CAPCOM Okay, thank you.
PAO This is Apollo Control. We have heart
rate information now for the second EVA. The peak rates
for each of the crewmen were between 165 and 170. The low
rates ran 80 to 90. For the better part of EVA both crewmen
heart rates were about 100. The average BTU consumption was
1000 for the commander, Pete Conrad, and 1100 for the lunar
module pilot, Al Bean.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 1365000 CST 0312 426/1

CAPCOM Intrepid, Houston. We have some words for you on the stowage of the TV and also the equipment which is put on the floor by the G27.

INTREPID Hey, we're right at that point; just ready for you.

CAPCOM Okay, Pete. On first, fold the TV handle and stow it in the LIOH canister bracket on the engine cover; lense up. Secure the TV cable into the camera; pad the camera with utility towels in the upper booth bay. Replace the knurled knob hole down, secure camera with utility straps. Wrap the straps around the lense and the knurled knobs.

INTREPID Understand.

CAPCOM Intrepid, give me your call when you are ready for some information on the equipment to go by Z27.

INTREPID Okay. That'll be 10 - 15 minutes.

CAPCOM Intrepid, Houston; you can expect loss of comm here for about 1 to 2 minutes. We have a hand over.

INTREPID Okay. Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0322 GET 137:00 427/1

COMM TECH Honeysuckle, Houston COMM TECH, air to ground 2.

HSK COMM TECH This is Honeysuckle. Read you loud and clear.

COMM TECH Roger, same, (garbled)

COMM TECH Honeysuckle, Houston COMM TECH.

HSK COMM TECH Honeysuckle, 100 percent on keys.

COMM TECH Roger, Honeysuckle to go.

HSK COMM TECH Roger.

INTREPID Okay, Houston, start talking to us about the gear you want us to tie down back of the OPS's.

CAPCOM Roger, Pete. Okay, first point there is insure that the P27 bulkhead is protected. You can use data books and towels for that purpose. We suggest also, on tying down the equipment and rocks which you have in the bags there go on the floor next to the Z27, by the OPS. You can use 2 additional strans of the utility straps. They will go from the top of the jettison bag to the ISA attach fitting. That's the D ring. Now the midsection step: This will give you 4 strans total.

INTREPID Say the last part again, Ed.

CAPCOM Okay, we suggest you use 2 additional strans of the utility straps. Now this would go from the top of the jettison bag to the ISA fitting, that's the D ring on the mid section step. This will give you a total of 4 strans. Essentially what we're looking for here, Al, is to tie this thing down with as many strans as you can; at least 4 so that in the docking we don't get this thing coming off the floor and busting the straps.

INTREPID Understand.

END OF TAPE

CAPCOM Yankee Clipper, Houston.
CLIPPER Hello, Houston. Clipper here.
CAPCOM Hello, Dick. Pete and Al are just finishing up the post EVA, and it looks as though they're pretty far ahead. They have a little bit of time to sit back and relax. We have a REV update for REV 29 when you're ready to copy.
CLIPPER (broken up)
CAPCOM Dick, say again. You're broken up.
CLIPPER Roger, I'm ready to copy. Tell those guys they deserve a rest. They can sit back and relax. It's a perfect job.
CAPCOM Roger, will do. LOS 1383234 1385742 1391849.
CLIPPER Clipper copies.
CAPCOM Roger, Dick.
CLIPPER Yeah, as soon as I can get this thing popping, (garbled).
CAPCOM Dick, that's affirmative. They ran into a few things, but as they did yesterday, they overcame them. No problems.
CLIPPER I expect most of their problems are human.
CAPCOM Maybe so, Dick, but not many of them errors. Dick, will you go back in your flight plan to 131-30. We missed a crew status report at that point.
CLIPPER Okay, Houston. (garbled)
CAPCOM Yankee Clipper, Houston. How do you read?
CLIPPER Loud and clear. How me?
CAPCOM Stand by, Dick. We still have a lot of garbling, and broken up.
CLIPPER Okay.

END OF TAPE

INTREPID Houston; Intrepid; we have everything stowed, geared properly, and we are ready to start the launch countdown at the proper time, and if you'll give us about 15 or 20 minutes to chow down here, we'll come back with you and have a little chitty chat about EVA.

CAPCOM Roger Pete; that sounds like a good plan.

CAPCOM And Pete; you are still quite a bit ahead. It looks as though the furthest you could go up to in the check list is on surface 101. Liftoff minus 240; you will have to hold at that point until we get you the right CSM state vector.

INTREPID Okay; no problem. I'm not hustling on that; we're just sitting here now getting the spacecraft all squared away, everything is tied down, but man oh man, is it filthy in here; we must have 20 pounds of dust, dirt and all kinds of junk.

CAPCOM Roger Pete. That'll be an interesting zero g.

INTREPID (garbled)

INTREPID Al and I look like a couple of coal miners at the moment. But we're happy.

CAPCOM So are a lot of people down here.

INTREPID Hey let me get a time hack with you on my mission timer; I'm reading 137463456789 plus 3741; is that about right?

CAPCOM Roger Intrepid; you are a couple of seconds off; we can give you a more accurate time hack if you like.

INTREPID No, that's all right. I can get the computer out; I can get the time hack okay.

CAPCOM Okay.

INTREPID I just happened to think about it; I haven't messed with the mission timer since we landed.

INTREPID Hey Houston, how is the SIDE doing; did it (garble) get running or not?

CAPCOM Stand by on that Pete; we'll get the latest word on it.

INTREPID Also how is the package temperatures doing? Are they running like they expected?

CAPCOM Pete; looks good on both counts. The DCIG came up and is looking nominal and the temperatures are looking nominal.

INTREPID Very good. All are running, huh?

CAPCOM That's affirm. And I'll tell you, from watching those plots from down here, that TSE is sure doing the job.

INTREPID Great.

END OF TAPE

INTREPID Houston, Intrepid.
CAPCOM Intrepid, Houston. Go ahead.
INTREPID Roger, we've been running our - if
you'll look at our schedule there - we've been running our
tape recorder according to the schedule, and because the
EVA is (garbled), do we have anything left on that for
ascent rendezvous? Could you check that out for us?
CAPCOM Roger, will do, Pete. Stand by.
CLIPPER Go ahead, Houston. Confer line.
CAPCOM Yankee Clipper, we copy.
CLIPPER And if you're interested in the status
report of last night, that's just when we were asleep. We
had a (garbled) of 11019.
CAPCOM Roger, we copy 7 hours and 11019, and
Dick we're having a little bit of trouble understanding.
CLIPPER (garbled).
CAPCOM Dick, you sound slightly garbled. I'm
wondering if the microphone is in a cut position relative
to your mouth.
CLIPPER How do you hear me now?
CAPCOM Rog, that's a little better.
CLIPPER Okay, I moved it in closer to the
mouth.
CAPCOM Dick, we show a real strong signal
now here, but the transmission is still slightly garbled.
CLIPPER Okay, Houston. We're still working
on it.
CAPCOM Roger.
CAPCOM Yankee Clipper, Houston.
CLIPPER Go ahead, Houston.
CAPCOM Dick, would you go ahead and stir the
cryos for 3 minutes? We'd like to see where we stand with
respect to balancing.
CLIPPER Okay.
CLIPPER Houston, are you copying those three
angles?
CAPCOM Clipper, that's affirmative. We have
the angles.
END OF TAPE

CLIPPER Okay, Houston, (garble) in 3 minutes.
CAPCOM Roger. Dick. We copy that. It almost looks as though you're balanced. About 1 more REV ought to do it, then you'll be going back to AUTO.

CLIPPER Okay.
INTREPID Intrepid, ready to copy.
CAPCOM Roger, Intrepid.
CAPCOM Yankee Clipper. Are you ready to copy?
CLIPPER (garble)
CAPCOM Roger.
CAPCOM P17 140 05 15 T18 142 03 40.
INTREPID Okay, Intrepid copies 14005 15 142 0340.
CAPCOM Read back is correct, Intrepid.
INTREPID And Houston, Intrepid standing by to copy the P22 ATT time and the (garble) numbers and we're also ready to debrief with them. Standing by for your questions.
CAPCOM Okay, Intrepid. We're not planning to do that P22. The jobs been done already so we can forget the P22 coming up at 140 pluss 00.
INTREPID Okay.
CAPCOM And Intrepid, we have your consumables PAD when you are ready to copy.
INTREPID Ready to copy.
CAPCOM Consumables at GET are 13700 RCS A 80 percent, B 76, 02, and we'll give you first the descent and the ascent 4796 H2O 39.5 99.2, amp. hours 729.7 572.3.
INTREPID Roger. Copied all that.
CAPCOM Okay, Intrepid, and on your question on the tape recorder, we show that under the number that we would normally figure that by extending those 2 EVA's we come up with 10-1/2 hours whereas the tape recorder normally goes 10, however, those assumptions are first 100 percent activity in the descent and ascent and the rendezvous and 30 percent activity on the EVA. The 100 percent is most likely high and the 30 percent figure is most likely low so its pretty difficult for us to come up and tell you exactly when they're going to be cutting off in the ascent or if you will at all.
INTREPID Okay. Let's just go ahead and run it per the schedule.
CAPCOM Roger.
CAPCOM Okay, Intrepid, and our first comment on the EVA. The Goldflight team members back here would like to give you congratulations for a job well done.
INTREPID Thank you.
CAPCOM Ready Intrepid, we have a few questions. First one of which is on the weigh bags and their cracking. Could you briefly describe the problem you encountered in cracking and what the reason may be for it?

INTREPID Well, they seem to - when I folded the first big one - let me think a minute - I know, the contingency sample one, I believe has a hole in it doesn't it Al? I can't remember on that but anyway the first big one wound up just about an inch and a half long crack appeared in it when I was folding it just like a fatigue failure, and that appears to be pretty much what happened. I noticed a couple of saddle bags, the same way after we got done rattling around with them. They had some 1 or 2 inch cracks which made holes in them. Okay?

CAPCOM Roger. We copy. That was - can you relate it to a given thermal situation, in other words, were they all cold at the time or really couldn't you say that?

CONRAD I really couldn't say. I think you all realize from the angle we're at that the Mesa was in the Sun. Did you all know that?

CAPCOM Okay. No, we didn't know that. At least I wasn't aware of that one.

CONRAD Okay. It's not completely in the Sun, but it's almost in the Sun. When I say almost, you know there are some things that throw some shadows and everything, but that area was in sunlight.

CAPCOM Roger, Pete. Yankee Clipper, 1 minute till LOS. See you on the other side.

CLIPPER. Roger.

CAPCOM Question 2, Intrepid. Could you discuss the failure of the camera handle?

INTREPID Yes sir, that narrow knob came off the shaft that it was mounted to, therefore, allowing all the pieces to fall apart.

CAPCOM Roger. And how did the hammer fail? Did it fail in some way other than just the chips of the coating coming off?

INTREPID No, that's all just the coating was coming off.

CAPCOM Roger.

CAPCOM Okay, what problems did you have with the S-band in terms of the cable, and also where exactly did you put them?

INTREPID I didn't - its the fact that I wasn't looking where I was going and I got tangled up in the S-band antenna wire once in awhile. It's not as bad as the TV though because the TV one doesn't lay flat, the S-band one lays flat. We put the S-band one out just like we agreed to do it, and minimized running over the wire which was out the plus Y direction pretty much.

CAPCOM Roger, and Pete when you went back to check the CCIG, could you tell us how close you got to it.

CONRAD I just walked up to it within about 5 feet of it.

CAPCOM Okay, thank you.

INTREPID Okay, any question on the third film pack which we used. How much of that was used on the inside, and where in traverse did you pick it up, and change it to 1 of the existing cameras?

INTREPID Well, I've got some bad news for you, and some good news. In the first place, the third magazine was a color magazine and all it had on it were some shots that were taken on earth rise and a few things like that coming around on descent and unfortunately Al and I got our signals crossed and it's outside on the lunar surface right now. What we did was take the black and white magazine off of Als camera when it failed, and put it on my camera and used it up so that we had 2 complete black and white of the second EVA.

END OF TAPE.

INTREPID On my camera it used it up so that we have two complete black and white of the second EVA and two complete colors of the first EVA and the only thing that's missing is the color magazine that had undocking and some other mundane things like that on it and at the beginning of the LM operation and unfortunately that's out there in the saddle bags. We didn't catch that one.

CAPCOM Okay, you did get the Surveyor, though?

INTREPID Oh, yeah, we have all the Surveyor pictures and everything but they're all black and white.

CAPCOM Real good. And lastly, we've been looking at your power consumption profile and notice that you're not using as much as they initially anticipated. They attribute that to the lack of use of the floodlights. Would you confirm that you've not had the floodlights on since the beginning of the first EVA.

INTREPID That's right we haven't had the floodlights on and also we've used LCG box very, very little. Every once in a while we give ourselves a squirt. The spacecraft contracts and yields we've been very warm and we've been comfortably warm with just the air in our suits and I'd say the temperature inside here right now is running in the low 70's somewhere and it's been that way every since we got here.

CAPCOM Roger, Pete. Okay, that's the last of our questions. We could finish this up if you give us 2 PRD readings.

INTREPID Okay, wait 1. A1 is 04022 and I'm still 11020, it'd kind of give you the idea that mine may have quit running.

CAPCOM Okay, Pete. We copy you 04 to 022 and say the second.

INTREPID 11020 and I think that's what it was the last time I gave it to you.

CAPCOM That's correct, Pete.

CAPCOM A question on the -

CONRAD Maybe it quit running.

CAPCOM Could be.

INTREPID What question.

CAPCOM On the equipment jettison was there anything other than what's already called out for that was jettisoned or not jettisoned.

INTREPID Well we jettisoned everything according to the checklist.

CAPCOM Roger. Say, Pete, how does the inside of the cabin look about now?

INTREPID It's very neat and orderly except for the fact that it's very dirty.

CAPCOM Kind of a neat orderly coal mine.

INTREPID That's about the size of it. The only thing that we do have, of course, is the LIOH canister container which now has the TV camera in it.

CAPCOM Roger.

INTREPID The K antenna is down and stowed.

CAPCOM Roger and we also understood the nail on the (garbled) was only partially deployed, it only got up around 60 degrees.

INTREPID Okay, when I was - I was the one to put it up and when I put it back down I discovered that I hadn't turned it the last about 20 percent and so it went all the way up and I don't know which one is correct.

INTREPID You have to put it all the way up.

CAPCOM Roger, Pete. The COM was beautiful probably of any SIM we've had.

INTREPID I concur, the COMM really has been super. PLSSes and suits performed magnificently. The suits are in shambles though.

CAPCOM Say Pete and Al when you climbed back in you terminated at 3 plus 55 and both of you were - your reserve was determined by oxygen. In PLSS 1 the reserve was 2 plus 05 which would have given you a 6 hour PLSS and PLSS 2 was 1 plus 50 which is pretty close to six hours also.

INTREPID That's very interesting to know and there's no reason why you can't stay out there and work that long. You don't get tired.

CAPCOM Get a little thirsty though I bet.

INTREPID We were. We were really thirsty after the second EVA test pad. I don't know yet how far we went, I think we made a pretty good trip out there.

CAPCOM All right, Pete, we're estimating over a mile for the first full circuit.

CAPCOM But that's not counting some of the side jaunts you made.

INTREPID We've been -

INTREPID Yeah, we've been trying to follow our tracks out here with the binoculars. The other thing that I - I - have you got your map book here, let me talk to you about this bigblocky rimmed crater that's out here.

CAPCOM Yeah, standby on that though.

CAPCOM Okay, we got the map.

INTREPID Okay, it's the great big map it's the crater with 1 to 10 really big rocks on it, just outside the lift on map A.

CAPCOM Okay, Pete which is the great big map?

INTREPID Okay, the one that shows the landing lift.

INTREPID It's number 39, wait a minute I'm tired. Let me - look just a second. It's number 30 chart.

INTREPID You know that crater is on our horizon and we can see it from here and I can sit here with the map and pick out the really great big boulders and everything and one of the problems up here is there is nothing to break up - or there's nothing between you and any object that you happen to pick up out there like a rock to judge distance by. And when we first landed I really thought that crater was like a thousand feet away but it's obviously a whale of a lot further than that away. It looks like it's right next to us, and we can use the binoculars and scan those gigantic boulders over there. That's the only one that's visible to us on the horizon but I wanted to point out that you can get an idea and of the fact that that really looks like it's about a thousand feet away from us but you know how far away it is from us and how difficult it is to sketch this one.

CAPCOM Roger, Pete. Maybe the use of that LM shadow then was pretty useful. I know in the beginning you doubted that the shadow was really that - that long and apparently it was telling you the truth.

INTREPID Yeah, I think you're probably right. The other thing is from the - from the spacecraft here looking at the ALSEP, it looks like it's right under the window and Al and I are just guessing that it's at least 450 feet away. Now.

CAPCOM Roger.
END OF TAPE

INTREPID Say, I got a question for you, Houston. What do the experts think about doing an alinement in orbit now, for instance what we got here on the lunar surface yesterday?

CAPCOM Copy your question, Pete. Stand by. Also, that crater which you were talking about is we estimate 4 1/2 kilometers from your present position.

INTREPID Looks like it's just a hop, skip, and a jump.

CAPCOM Pete, we'd like to go ahead and stick with the procedures we have now. We can give you an update on it after the 2 P57's and insertion. There's a chance that we may not need it.

INTREPID Okay, I wasn't proposing that we didn't do it, I was going to go ahead and do it. I was just curious after we got a good RLF which was never gotten before out of the P57 yesterday and what everybody thought about that. Say, Houston, one thing that occurred to me, the reason we're not using the flood lights is because that overhead hatch is not rigged right and (garbled) all the time, and I should say the microswitch isn't rigged right, the hatch is okay. And those flood lights were on all the time, so when we were getting ready to come down over in shaded side, we had the floods on, just the lower ones which were still always on, but we pulled that breaker, and we've left it out all the rest of the time. That's the reason -

CAPCOM Roger, we copy that. Say, Pete and Al, do think that if you were up there for say 4 1/2 or maybe 5 hours, you'd get hungry as well as thirsty on a - our extended traverse?

CONRAD I don't think so if you chowed down good just before you left.

BEAN I agree with that. You really get thirsty though. Maybe they can come up with something that you can put on the inside of your helmet, something not exactly like the little (garbled) device, something where you could maybe reach over and take a - even a swallow of water here. You're only thirsty cause your throat is dry, and if you just had something like one swallow, I think that might fix you up right there.

CAPCOM Roger, Al. Say, did either one of you kneel down in order to get anything off the surface, or did you use the newly developed Bean technique of holding on to the Surveyor parts bag and lowering the commander to the surface?

INTREPID Well, we used all kinds of things like that. You could take the shovel and stick it in the ground and just do a one arm pushup, and lean down and pick up a rock while you grab the other end. It's really a

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 5:07, GET 138:45:00 433/2

INTREPID ridiculous way to do it. If you had a good way to bend, why you'd have the whole program wired, but you could do that. Okay, I fell over once out there, and Al picked me back up again. It's no big deal.

INTREPID But in the same sense, you're always messing around trying to get down there to get these rocks, and we did kneel down a couple of times. I knelt down and picked some up. It is particularly easy if you got that (garbled) carrier with you. But we really do need to come up with some sort of strap or something that would allow you to lean over and grab a rock that won't fit in those prongs.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1385500, CST 0517 434/1

INTREPID Houston, Intrepid, picking up the launch prep at 98 and LO minus 250.

CAPCOM Roger, Intrepid.

END OF TAPE

PAO This is Apollo Control Houston. We're at 139 hours 5 minutes into the flight. Meanwhile in Mission Control Center Houston, we are having a shift change. Flight Director, Pete Frank, and members of his orange team are now aboard, and a News Conference will be held in the News Center within the next few minutes with Flight Director, Jerry Griffin. We're at 139 hours 6 minutes into the flight and this is Apollo Control Houston.

INTREPID Okay, Houston, you see that 212. Its the same thing we had before, also.

CAPCOM Roger, Intrepid. We copy, and we concur we expect it.

PAO This is Apollo Control Houston at 139 hours 15 minutes now into the flight of Apollo 12. We're some 2 hours 50 minutes away from time of ignition and Conrad and Bean start turning their attentions to preparations for liftoff. Both guidance systems, the prime and backup are powered up and systems tests are performed. The 2 guidance systems are aligned, the AGS to the PNGS, the rendezvous radar will be turned on, and the self test is performed, the inertial platform

CAPCOM Go. We have an update on the star Arcturas on page 102 in the surface check list. We'd like you to use Procyon 16 or Sirius 15 and that's detent 1.

PAO The inertial platform is alined for the rendezvous radar tracking of Yankee Clipper on its last overhead pass, this pass prior to liftoff. The radar is turned off following this and remains off during ascent. At this time we will turn the release line over for a News Conference at the News Center. The tape will be turned over directly to transcript. We're at 139 hours 15 minutes into the flight and this is Apollo Control Houston.

END OF TAPE

INTREPID Okay, and we did a dump test all right.
 CAPCOM Roger.
 INTREPID Are you ready for (garble) dump?
 CAPCOM That's affirmative; we are ready for
 the E mod. Intrepid; Houston.
 INTREPID Go.
 CAPCOM If you will give us POO and ACCEPT,
 we'll give you a CSM state vector and RLR update.
 INTREPID You have POO and ACCEPT.
 YANKEE CLIPPER Hello Houston; Yankee Clipper.
 CAPCOM Yankee Clipper; Houston. Loud and
 clear.
 YANKEE CLIPPER Good morning Houston: how are you?
 CAPCOM Morning Dick; we are fine; how are you?
 YANKEE CLIPPER Well pretty good. (garbled)
 CAPCOM Roger. Got the house clean?
 YANKEE CLIPPER I was gonna say I just finished now;
 I sure do; everything in order; ready to go towards the LM
 and bring back (garble). That's quite a chore; keeping this
 thing clean.
 CAPCOM Roger; you got a couple of coal miners
 coming up to see you.
 YANKEE CLIPPER That's okay; I'll be glad to see them.
 CAPCOM Intrepid; Houston. The computer is
 yours; Yankee Clipper, if you will go POO and ACCEPT, we have
 an uplink.
 YANKEE CLIPPER All yours.
 INTREPID Houston, you got some liftoff times
 for me?
 CAPCOM Stand by.
 CAPCOM Intrepid; Houston. Your liftoff time
 is 142:03:47.
 INTREPID I copied 142034700.
 CAPCOM Affirmative.
 CAPCOM Clipper, Houston. Computer's yours.
 YANKEE CLIPPER Okay, and (garble) battery charged
 (garble) buss lines (garble) turning them off now.
 CAPCOM Roger. Yankee Clipper, Houston. Why
 don't you figure on terminating the battery charge at LOS.
 YANKEE CLIPPER All right. Should I go back on my
 revs just before liftoff (garble) all the way up.
 CAPCOM Clipper; Houston. We prefer that you
 terminate at LOS on this pass.
 YANKEE CLIPPER Roger.
 CAPCOM Roger. That will be one less thing for
 us to keep track of prior to liftoff.
 YANKEE CLIPPER Okay.
 INTREPID Houston; Intrepid.
 CAPCOM Intrepid; Houston. Go.
 INTREPID Roger; did you look out the AOT in the
 (garble) you can see these light - particles of light - flashing

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 13915 CST 537 436/2

INTREPID light (garble) coming from behind the LM and then sailing off into space (garble) dropping from our water boiler, but it looks like some of those things are escaping the moon; they really haul out of here, going to the stars.

CAPCOM Roger.

CAPCOM Yankee Clipper; Houston with a P22 tracking pad.

YANKEE CLIPPER Go ahead.

CAPCOM Roger. Your targeted at LM T-1 is 1395739 T 2 at 1400238, south 05. Latitude is minus -

YANKEE CLIPPER Roger - T 112 -

CAPCOM Latitude - minus 3036, longitude over 2 is minus 11.709; altitude minus 1.13. If you want to take photos, your dock settings are 1/60th - 1 over 60, 1SP, one SPS, and PEX film.

CAPCOM You should be at zero local horizontal rather than 22 degrees pitch down; over.

YANKEE CLIPPER Roger; understand. T 1 1395739, T2, 1400238, 5 miles south, latitude is minus 3036, longitude over 2 is minus 11.709; altitude minus 1.13 and (garble)

CAPCOM Roger Dick. And I've got a rev 30 map update when you are ready.

YANKEE CLIPPER Go ahead.

CAPCOM Roger. Rev 30 LOS 140:31:05; 140:56:06, 141:17:20.

YANKEE CLIPPER Roger; your numbers were copied.

CAPCOM Okay, and Dick, I've got your consumable update when you are ready.

YANKEE CLIPPER Go ahead.

CAPCOM Roger. AT a GET of 139 plus 20 RCS total was 56 percent; ALPHA is 58, BRAVO 56, CHARLIE 56, DELTA 55, Hydrogen - tank 1 is 49.9, tank 2 is 49.8. Oxygen 52.7 and 54.4; over.

YANKEE CLIPPER Roger; copied that. (garble) okay.

CAPCOM Roger.

YANKEE CLIPPER Hey Jerry I would like to have a temp update also please.

CAPCOM Roger Dick; standby and we'll get it for you.

INTREPID Okay, Houston; you're looking at the DSKY torquing angles.

CAPCOM Roger - we see them Pete.

CAPCOM Intrepid; Houston.

INTREPID Go.

CAPCOM Roger Pete; how's your drinking water intake now since you got back in? You been replacing quite a bit of it?

INTREPID Yes sir.

CAPCOM Yankee Clipper; Houston. If you will give us POO and ACCEPT, we have another LM state vector for you

YANKEE CLIPPER Okay, Houston. I'm going to stop my roll here. Okay, go ahead.

CAPCOM Roger.

YANKEE CLIPPER Houston; do they object to tracking when he goes by this time? And do you have the (garble) or just the (garble)?

CAPCOM Intrepid; Houston. We had not really planned on doing a P22 on this pass.

YANKEE CLIPPER Okay - we'll forget it.

CAPCOM Okay - your brakes - Yankee Clipper; Houston; got your DAP update.

YANKEE CLIPPER Sock it to me.

CAPCOM Okay, about the only change you need is to go to a .5 degree deadband so R1 should read 11101.

YANKEE CLIPPER Okay - (garble)

CAPCOM Roger Dick; your weight and your trims look good.

YANKEE CLIPPER Okay; that's what I was worried about; thank you.

YANKEE CLIPPER I'll probably go to a half degree less on the rendezvous cause the maneuvers are pretty long.

CAPCOM Roger.

YANKEE CLIPPER Houston; Clipper. Never mind. Forget it.

CAPCOM Yankee Clipper, Houston. We are through with your computer.

YANKEE CLIPPER Roger - thank you.

CAPCOM Yankee Clipper, Houston. On your maneuver - go S band OMNI CHARLIE; over.

CAPCOM Yankee Clipper; Houston. Go OMNI DELTA.

END OF TAPE

PAO And now we're at 139 hours, 49 minutes now into the flight of Apollo 12. In Mission Control Center, Houston, we've had a change in the capsule communicators. Jerry Carr, now aboard replacing Ed Gibson at that position. While the line was down Pete Conrad from the Intrepid did call and ask for a liftoff time. Jerry did pass -

CAPCOM DELTA.
INTREPID Houston, Intrepid.
CAPCOM Intrepid, Houston. Go.
INTREPID Has Yankee gone overhead yet?
CAPCOM Not yet, Pete.
INTREPID Give me an overhead time, so I can

watch him go by.

PAO Jerry Carr did pass along an estimated liftoff time. We're 142 hours, 3 minutes, 47 seconds. Our displays in Mission Control show us that Intrepid should enter orbit with an apolune of 46.3 nautical miles, a perilune of 8.8 nautical miles. DELTA-V for that ascent burn would be 6,057 feet per second. About 1 1/2 hours before liftoff, Capcom Jerry Carr will be passing the liftoff maneuver pad to Intrepid. Presently we're at 2 hours, 13 minutes prior to ignition at 139 hours, 56 minutes continuing to monitor this is Apollo Control, Houston.

CAPCOM Intrepid, Houston. Clipper should be overhead at 140:04:110.

INTREPID Okay, thank you. I can check the flight team and see how good you are.

CAPCOM Stand by, Clipper, break. Intrepid, this is Houston. Clipper wants to know if you're at VHF.

INTREPID No, but we will come up VHF.

CAPCOM Roger, break, Clipper, Houston. Intrepid says he'll be up.

INTREPID Ask him whether he wants us on VHF A or V simplex.

CAPCOM Clipper, Houston. What would you like? VHF A or V simplex? Say again, Clipper. Intrepid, Houston. Come on VHF ranging configuration. Over.

INTREPID Will do.

PAO This is Apollo Control, Houston. We presently show Yankee Clipper in an orbit of 61.7 nautical miles by 58.7 nautical miles. We're now at 139 hours, 53 minutes into the flight. This is Apollo Control, Houston. We're at 139 hours, 58 minutes now in the flight. Our display here in Mission Control shows that the concentric sequence initiate burn -

CAPCOM Roger, Dick. Are you going to use the zero degree pitch or 22 degree pitch down for this pass?

PAO The concentric sequence initiate burn is scheduled for 143 hours, 1 minute, 50 seconds with a

PAO DELTA-V of 49.2 feet per second. This burn done at apolune following liftoff has the effect of raising the perilune a half a revolution later. We would look at numbers at that time for Intrepid of 46.8 by 43.6, some 15 nautical miles below the Yankee Clipper. We're 2 hours, 4 minutes, 18 seconds away from time of ignition. And this is Apollo Control, Houston.

INTREPID Hello, Yankee Clipper, Intrepid on VHF can you read?
CLIPPER Apollo, Houston. Clipper.
CAPCOM Yankee Clipper, Houston. Go.
CLIPPER Roger, Houston I don't like those ones at all that sun angle was pretty high and the whole area is washed out and it's the best that I could tell you and I think I was on the Surveyor crater but I can't be sure of that.
CAPCOM Roger, Dick.
CLIPPER That sun's a little too high that you find that right now.
CAPCOM Houston, to Intrepid. We had official awning although I couldn't talk to him on VHF.
CAPCOM We interpret, Houston. Roger.
CAPCOM Clipper, this is Houston. Did you read Intrepid on VHF?
CLIPPER Uh - that's affirmative.
CAPCOM Roger, you sure it wasn't S-band because you know we're in a relay mode.
INTREPID Intrepid to Clipper. I think it's VHF, Jerry.
CAPCOM Okay.
INTREPID Hey Jerry. that's the (garble) P22 data because I'm not sure of it.
CAPCOM All right, roger. Dick, we copied your data.
CAPCOM Clipper, Houston. WE'll give that data a good evaluation before we do anything with it.
PAO P22 reference there is the orbital navigational program for the Command Module, Yankee Clipper. We're at 140 hours and 9 minutes now into the flight and 1 hour and 55 minutes away from time of ignition for Intrepid.
INTREPID Houston, Intrepid. Houston, Intrepid.
CAPCOM Intrepid, Houston. GO.
INTREPID That's sort of an interesting thing going on AGS right now I didn't notice earlier but it may just be because the lights are brighter now. I'm getting an all 8's flight on both the address and the information registers at about 1/5 the brilliance of the normal numbers and it's hold in every second.
CAPCOM Roger, Al.
INTREPID If I turn down the illumination level just a little bit it's not noticeable.
PAO That was Al Bean describing some illumination on his AGS display, the abort guidance system display aboard Intrepid.
INTREPID Houston thru Intrepid, you ready for my RCS unfire?

CAPCOM Intrepid, Houston. Roger, fire away.
INTREPID Okay.
CAPCOM Intrepid, Houston.
INTREPID GO.
CAPCOM Roger Al, Fredo's here. He and I have both
seen that phenomena on your DEDA during testing of most all
the spacecrafts up at Bethpage and it was probably an EMI.
INTREPID That's what we've been talking about but we
thought we'd just touch in on it.
CAPCOM Roger. I think TRW's got a workup on this
problem.
INTREPID (Garble) roll left, pitched up.
CAPCOM Okay?
INTREPID Here you go Houston with roll, pitch and yaw.
CAPCOM Roger, Pete.
CAPCOM Intrepid, Houston.
INTREPID Don't panic we just blew over our S-band
erectable, we're up on our steerable.
CAPCOM Roger, I was iust going to tell you Pete, we
lost some of the data on that fire iet.
INTREPID Okay, you want me to give to you again?
CAPCOM Standby and I'll tell you what we need.
INTREPID I never gave you yaw anyway.
CAPCOM Pete can you just start over from the begin-
ning?
INTREPID Okay.
PAO Apparently from that last report the erect-
able S-band antenna outside was felled by that RCS test. We're
at 140 hours 14 minutes.
CAPCOM Intrepid, Houston. I've got a K vector update
when you're ready.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1401300, CST 0635 439/1

CAPCOM Intrepid, Houston. I've got a K factor update for you when you're ready.

INTREPID Okay.

CAPCOM Roger. R1 is 00140 R2 is all zips R3 is 00033.

INTREPID Okay, 00140 all zips 3 3's.

CAPCOM Roger.

INTREPID Okay, howid the hot fire look?

CAPCOM Intrepid, Houston. That went kind of fast.

Give us a chance to look at our tapes.

INTREPID Okay.

CAPCOM Intrepid, Houston. The passive seismometer just verified that you did do your hot fire.

INTREPID Very good. This seismometer said my hot fire was go.

PAO This is Apollo Control Houston. Jerry Carr reported recordings of the panel on the passive seismometer verifying the hot fire on the RCS. This data was received in our Experiment Staff Support Room.

INTREPID I understand I was GO.

CLIPPER Houston, are you ready for the gyro torquing angles?

CAPCOM Clipper, Houston. Roger, go ahead.

CAPCOM Intrepid, Houston. I have a LM ascent PAD and a CSI PAD.

INTREPID Okay, just a minute. Are you ready for the rest of my hot fire.

CAPCOM Roger. We're ready. Go ahead. Clipper, you can go ahead and torque.

CLIPPER Okay, thank you.

INTREPID Okay, I gave you an extra pickup fire cause we were photographing the effects on the ground. Quite spectacular.

CAPCOM Roger, Pete.

INTREPID I'm ready to copy the launch PAD.

CAPCOM Roger. LM ascent PAD follows. TIG 142034700 NOUN 76 5535000370 plus 0002, need A 47 is plus 37364 plus 05607 plus 58642 plus 56955, needle 465 is plus 00370 needle 465 is plus 00370, needle 546 is NA. Ignition 1 REV late is 1440209, LM weight 10789, CSM weight 35390. Over.

INTREPID Roger. Copy 142034700 5535000370 plus 0002 plus 37364 plus 05607 plus 58642 plus 56955 plus 00370, NA 144020900 107789 35390.

CAPCOM That's affirmative, Al. P32 CSI PAD follows. NOUN 11 143015060 NOUN 37 14438 all zips NOUN 81 0492 all zips

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1401300, CST 0635 439/2

CAPCOM needa 473 is 01818, 275 is 02780, AGS DELTA V's plus 0492 all zips plus 0010. Over.

INTREPID Roger. 143015060 14438 all zero's 0492 all zero's 01818 02780 plus 0492 all zero's plus 0010

CAPCOM Affirmative, Al.

CONRAD Okay, Houston. I'm standing by for your up data link and the LTC gyro torquing angles.

CAPCOM Roger, Pete.

CLIPPER Houston, this is Clipper. I copy those PADS.

CAPCOM Roger, Clipper.

END OF TAPE

CAPCOM Clipper.
CAPCOM Yankee Clipper, Houston. Over.
YANKEE CLIPPER Go ahead.
CAPCOM Roger, Dick. You can terminate your battery BRAVO charge now and we'd like to have you put your 02 Tank 1 heaters and your hydrogen tank 2 heaters back to AUTO and dump your waste water to between -
YANKEE CLIPPER (garbled)
CAPCOM Yankee Clipper, Houston.
YANKEE CLIPPER Go ahead. I've got the H2 and 02 heaters and dump the water and 52 percent.
CAPCOM Okay, that's it, Dick. Thank you.
YANKEE CLIPPER And I'll do a purge next.
CAPCOM Roger.
YANKEE CLIPPER I'll do a purge on the oxygen and hydrogen also.

PAO This is Apollo Control Houston. We are about 5 minutes away now from loss of signal with Yankee Clipper. Next time around, Yankee Clipper will be on his 30th revolution and Intrepid will liftoff on the 30th revolution. We're at 140 hours 26 minutes now into the flight of Apollo 12.

PAO In the ascent maneuver pad data pass up to Intrepid, which Al Bean copied, a liftoff time was given of 142 hours 3 minutes 47 seconds.

INTREPID Go ahead.
CAPCOM Pete, we'll be setting your gyro compensation uplink to you after you've done your second P57.
INTREPID Okay, there must be a mistake in the checklist.
CAPCOM Yes, that's right. It's poorly placed in the checklist.
INTREPID Okay. How did the hot fire look all the way around? Everything okay?

PAO Pad data shows a horizontal velocity for Intrepid of 5535 feet per second. We're at 140 hours and 28 minutes now into the flight.
INTREPID - for you, too, Houston. What did Yankee Clipper's orbit finally decay down to? How well did you hit 60?
CAPCOM Roger, Pete, it's 61.9 by 58.4 CDH.
INTREPID That's pretty good and we're targeted for zero CDH here on this thing, right?
CAPCOM That's affirmative.
INTREPID Okay.
PAO CDH standing for constant delta height. It's the second maneuver in the rendezvous sequence. Given a normal or nominal situation it could very well turn out to be zero. It's designed to fine tune the orbit and with the

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0645 GET 140:23 440/2

PAO numbers we're looking at it might very well turn out not to be necessary.

CAPCOM Yankee Clipper, Houston. We are about 35 seconds from LOS You're looking good, and we're looking for an AOS 141:17.

YANKEE CLIPPER Okay, Jerry, Thank you.

PAO We've had loss of signal with Yankee Clipper. Wer'e at 140 hours 32 minutes into the flight.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 6:55, GET 140:33:00 441/1

CAPCOM Intrepid, Houston. How do you read?

INTREPID Loud and clear.

CAPCOM Roger, read you the same.

PAO This is Apollo Control, Houston at 140 hours, 46 minutes now in the flight. We're 1 hour and 17 minutes away from time of ignition, away from Intrepid's lunar liftoff from the Ocean of Storms. Intrepid will ignite running almost 5,000 pounds of propellant through the upper stage ascent engine. Ignition will occur with Yankee Clipper passing just overhead about 80 nautical miles ahead of Intrepid. Intrepid goes through a short vertical rise and pitches over to climb to altitude horizontally inserting into orbit with a velocity of nearly 6,000 feet per second at an altitude of some 60,000 feet. It's been a period of quite between Capcom Jerry Carr and Intrepid. We've been watching data on the displays at - the crew aboard Intrepid has completed loading their abort guidance system ascent targeting data. We're at 140 hours, 48 minutes now into the flight, and this is Apollo Control, Houston.

END OF TAPE

INTREPID Houston; Intrepid.
CAPCOM Intrepid; Houston; GO.
INTREPID Any objections to us starting P57 now?
CAPCOM Hello Intrepid; we prefer that you wait
till 45 in order to maximize the Delta T there.
INTREPID You mean 15 I hope.
CAPCOM Yeah; that's right - 15. We were
thinking in terms of liftoff minus 45.
INTREPID I'm with you.
PAO This is Apollo Control Houston. Program
57 reference there is the lunar surface alignment program for
the LM guidance computer. We are at 141 hours, 2 minutes into
the flight, and 1 hour, 2 minutes away from time of ignition.
This is Apollo Control Houston.
CAPCOM Intrepid, Houston.
INTREPID Go ahead.
CAPCOM Roger Al - would you put battery 5 on
the line now? Before it wasn't really carrying its load as
well as it should have, and we would like to pre-pre condition
that one, get it a little warmer and get it started early.
INTREPID Okay, I noticed that; we'll do it.
CAPCOM Okay.
INTREPID That's exactly what it did prior to
descent - not much.
PAO This is Apollo Control at Houston at
141 hours, 9 minutes into the flight. We are 55 minutes
away from ignition at this time. And some 8 minutes away
from reacquiring the command module Yankee Clipper. In the
Mission Control Center, a period of relatively quiet prepara-
tion, no large contention of persons have arrived yet into
the viewing room, however in the control center proper
certain key NASA management officials as well as fellow astro-
nauts have arrived on the scene. Rocco Petrone, Apollo Director
of the Apollo Program, as is George Low, Chris Kraft, Director
of Flight Operations for the Manned Spacecraft Center, Jim
McDivitt, Manager of the Apollo Spacecraft Program at MSC,
Jim Lovell, the Commander for Apollo 13, Al Worden is here;
Donald K. Slayton, Director of Flight Crew Operations, and
Tom Stafford, Chief of the Astronaut Office. We are at 141
hours, 10 minutes into the flight and this is Apollo Control
Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 7:32, GET 141:10:00 444/1

PAO This is Apollo Control, Houston at 141 hours, 16 minutes now into the flight. We're less than a minute away now from reacquiring the command module, Yankee Clipper, now on its thirtieth revolution.

CAPCOM Yankee Clipper, Houston. How do you read?

INTREPID Here, read you loud and clear.

CLIPPER Read you loud and clear.

CLIPPER Houston, Yankee Clipper. Read you loud and clear.

CAPCOM Roger, Clipper. Reading you the same.

CLIPPER (garbled) let's go here (garbled).

CAPCOM Roger, Dick.

CAPCOM Clipper, Houston. Your state vectors are all good, so there will be no uplink to you this time. Your map update pad is scratched, and I've got a landmark tracking pad if you're ready to copy.

CLIPPER Roger. Do you want us to do this one, or can we skip it?

CAPCOM Stand by.

CLIPPER The reason I say that, Jerry, is because I can't see them at the high sun angles. It's academic to do this one. I'd just soon save the gas and skip it.

CAPCOM Roger, Dick. We're talking about it.

CAPCOM Clipper, Houston. The data's

END OF TAPE

CAPCOM Clipper, Houston, the data is only in the event you want to watch liftoff.

YANKEE CLIPPER Yes, I know that and I don't think I can see them, Jerry, so lets skip it. The sun angle is too high.

CAPCOM Okay, Dick.

PAO This is Apollo Control, Houston. You heard that exchange between Dick Gordon and Capsule Communicator Jerry Carr. What the discussion evolved about, Dick Gordon, aboard the Yankee Clipper, had the option of tracking Intrepid with his sextant on liftoff. As you heard, he indicated that the sun angle appeared too high to acquiring a sighting so that will probably be deleted from the actual flight plan. We're at 141 hours 21 hours into the flight, 42 and a half minutes away from time of ignitio, and this is Apollo Control Houston.

CAPCOM Intrepid, Houston, your gravity angle difference looks good and there will be no uplinks to you this time.

INTREPID Very good, very good.

CAPCOM Yankee Clipper, Houston.

YANKEE CLIPPER Go ahead.

CAPCOM Roger, Dick, here is the call plan. About the time when you get VHF communications established with Intrepid, we're going to dump the MFSN relay. If for some reason you lose it and you want to hear the Intrepid liftoff, let us know and we can reconfigure in about 20 seconds, but we would prefer to leave the relay out as long as you've got VHF.

YANKEE CLIPPER Roger, I think that will be fine. Thank you.

INTREPID Boy, this place is fascinating, absolutely fascinating.

CAPCOM Roger.

PAO That was Al Bean aboard the Intrepid. We're at 141 hours 23 minutes now into the flight.

PAO This is Apollo Control Houston 141 hours 30 minutes now into the flight. Conrad and Bean are now going through the final phases of verifying navigational alignments. You heard that car up from Jerry Carr committing the torquing angles onboard as they are going through Program 57, lunar alignment. At this time, Flight Director Pete Frank is checking status, pulsing all of his flight control team as to our status GO or NO-GO, and we're standing by.

CAPCOM Intrepid, Houston. You are GO to cast off on this rev.

PAO This is Apollo Contril Houston, You heard that call from Jerry Carr giving them a GO for liftoff this rev. At T minus 10 seconds, one of the two, probably Conrad, pushes the abort stage button and the 2 stages,

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0742 GET 141:20 445/2

PAO although still mates are no longer mechanically secured to each other. The ascent engine is armed at minus 5 seconds. Conrad pushes a PROCEED button on his computer display telling it to continue on in program 12 for liftoff. At T zero he pushes the ENGINE START after verifying that the engine is indeed ON. We're at 32 minutes now away from ignition, and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1413200, CST 0754 446/1

BEAN (garble)

CAPCOM That's affirmative, Al, and they're go.

PAO This is Apollo Control Houston at 141 hours 42 minutes now into the flight. We're 22 minutes away from time of ignition. After ignition, Conrad confirms that the LM is stable and the altitude is increasing. Visual cues are prime for the first fifteen seconds. After pitchover is completed, the crew will be able to make their first solid checks on the primary guidance and navigation systems' performance. At liftoff plus 4 minutes, Conrad yaws Intrepid 20 degrees right to insure a continuing S-band lock. When time from ignition reaches approximately 6 minutes 15 seconds, the onboard displays are changed from a velocity and altitude numbers to velocity to be gained. You'll probably hear Al Bean calling out some of these numbers. Engine shutdown monitoring is performed onboard simply by observing the velocity to be gained displayed. We're at 21 minutes now away from time of ignition.

INTREPID Net 1.

CAPCOM Roger, Intrepid.

CAPCOM Intrepid, Houston. Looks good.

CAPCOM Tank 2 looks good.

PAO That was Capcom Jerry Carr telling Intrepid that their tank pressures look good. Meanwhile in the Control Center, our upfront displays have switched over from the Flight Dynamics Trajectory Displays, the lunar map being taken down for this ascent phase of the mission. We're at 141 hours 44 minutes and 19 minutes 45 seconds away from ignition.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1414500 CST 0807 447/1

INTREPID Bats 2 and 4 coming on Houston.
CAPCOM Roger Intrepid.
PAO This is Apollo Control Houston at 141
hours, 49 minutes.
INTREPID Amending VHF A receiver on or off,
for launch; over.
CAPCOM Stand by Intrepid.
PAO We are 14 minutes away from time of
ignition now - the -
CAPCOM Intrepid; Houston; need to have your
VHF A transmitter to voice range and receiver OFF.
INTREPID That's where she's at; thanks.
PAO Intrepid presently has program 12
entered on their onboard computer; this is the guidance program
for lunar liftoff. We are 141 hours, 50 minutes into the
flight, and a little more than 13 minutes from time of
ignition.

PAO This is Apollo Control Houston, 141
hours, 52 minutes till the flight. Flight Director Pete
Frank making a final check around the room as to the - our
status for liftoff. We are 11 minutes, 48 seconds from
scheduled time of ignition. This is Apollo Control Houston.

PAO This is Apollo Control Houston. We are
10 minutes now away from time of ignition. 141 hours, 54
minutes into the flight of Apollo 12. FIDO reports we have
high speed data coming in from all 3 sites; we are at 141 hours,
56 minutes - 7 minutes, 54 seconds away from liftoff at this
time. Mark - 5 minutes from scheduled time of ignition.
We are at 141 hours, 59 minutes now into the flight. We are
4 minutes away now; this is Apollo Control Houston standing
by.

END OF TAPE

PAO Mark 3 minutes from liftoff.
INTREPID Hello Houston, Intrepid is on VOX. How
do you read?
CAPCOM Loud and clear, Pete.
INTREPID Roger, checklist is complete, standing
by for TIG minus 2.
CAPCOM Roger.
PAO That was Pete Conrad reporting they had
completed their checklist. We're at 142 hours 1 minute.
PAO Mark 2 minutes.
INTREPID (garbled)
INTREPID Set your what?
INTREPID I set that in 1 minute.
YANKEE CLIPPER Picked up (garbled) LM
CAPCOM Roger, Clipper. Intrepid, Clipper's
watching you.
INTREPID Howdy, Yankee Clipper. Okay, you read
good.
INTREPID By my time, Yankee Clipper, it will be
1 minute, Mark 1 minute master arm is ON. (garbled)
INTREPID
INTREPID Okay, push in 30 seconds, Pete.
INTREPID Roger.
INTREPID Watch the ALSEP and I'll fly the bird.
INTREPID Looks good to me.
INTREPID (garbled)
INTREPID DSKY's blank.
PAO 30 seconds.
INTREPID Average g (garbled) engine arm ascent.
All we lack is pull, and then after we get it start.
INTREPID Okay.
INTREPID 20 seconds.
CAPCOM Looking good, Pete.
INTREPID Okay.
PAO 10 seconds.
INTREPID 9, 8, 7, 6, 5, Arm -
INTREPID Go.
INTREPID 3, 2, 1, liftoff. And away we go.
INTREPID The engine is fired.
INTREPID Going?
INTREPID (garbled) descent stage (garbled)
INTREPID It's good.
PAO Looking good.
INTREPID (garbled)
CAPCOM Intrepid, Houston, copy ignition guidance
looks good.
INTREPID Pitch over is looking good.
PAO 316 feet above the lunar surface.
INTREPID Boy, you sure do (garbled)

INTREPID (garbled) I don't know what.
INTREPID Mark, 30 seconds, 30 seconds (garbled)
PAO 1594 feet above the lunar surface.
INTREPID - feet, that's pretty good.
INTREPID We're on our way.
INTREPID And at 1 minute, yaw right 20, Pete.
INTREPID Okay.
PAO Velocity building up now, 264 feet per
second.
INTREPID Say again.
PAO Coming up on 1 minute.
INTREPID This program looks good.
INTREPID Kind of wobbling around up here.
CAPCOM Intrepid, Houston, looking good at
1 minute.
INTREPID We've gone right (barbled) Keeping right
down the pike.
INTREPID Okay.
INTREPID Looks good.
INTREPID (garbled) pressure look good, Pete.
INTREPID What a nice ride. The closer you get,
(garbled) right in here.
PAO That's Conrad reporting they're going
right down the pike.
INTREPID Yes.
INTREPID It's nice and smooth.
INTREPID (garbled) ride (garbled) part of it.
INTREPID All right, 1 plus 30, 745, and you
can pitch -
PAO Presently 9000 feet above the lunar
surface.
INTREPID Good jump.
INTREPID Okay, just changing PG.
INTREPID I know it.
INTREPID It's still pretty.
PAO Velocity now 850 feet per second.
INTREPID (garbled) it's right out of (garbled)
INTREPID Mark it, 2 minutes.
INTREPID 2 minutes. 1061, 175, (garbled)
CAPCOM Intrepid, Houston Go at 2.
INTREPID Just a little bit higher.
PAO 2 minutes 10 seconds looking good.
INTREPID Everything looks good Pete (garbled)
INTREPID Sure does.
INTREPID Looks like we're in the same territory
we passed over before. (garbled) perfectly.
INTREPID Roger.
INTREPID Okay, mark 2 minutes and 30 seconds,
looking at 1373, 187, and I've got a 19 700. Houston, you

INTREPID better clear me out of flight level
240 for flight level 600.
CAPCOM Roger, squad 21.
INTREPID All right.
INTREPID (garbled) 21.
PAO Coming up on 3 minutes.
INTREPID (garbled) Al.
INTREPID Everyting looks real good, Pete.
INTREPID (garbled) 3 minutes, 1752, 194, climbing
at a 25 000.
YANKEE CLIPPER Houston, Clipper. If you can, have him
(garbled) VHF (garbled)
INTREPID Say again, Dick.
CAPCOM Dick wants you to transmit on VHF.
PAO Range to go now 137 nautical miles.
INTREPID (garbled) on VHF.
INTREPID 3 minutes and 30 seconds, Al. 2130 feet
per second, climbing 193, and we're at 31 600.
INTREPID Okay.
INTREPID The camera went off sometime after
liftoff. I hope it get the ALSEP.
INTREPID It's still running.
INTREPID I turned it back on.
INTREPID Oh, I see.
INTREPID Wonder why we got the master alarm. I
never did see it.
INTREPID I didn't either. Everything looks good.
CAPCOM Houston, you're looking good at 4.
INTREPID (garbmed) minutes.
INTREPID 2500 (garbled)
PAO Mark, 4 minutes 8 seconds, now traveling
at 2400 feet per second.
INTREPID Oh, look at that rille down there.
Wow. It's part of (garbled) I think beyond the LM.
INTREPID Hey, the camera stopped again, Pete.
INTREPID You're kidding.
INTREPID mark, 430.
INTREPID 2954 feet,
INTREPID This is a hot machine.
INTREPID 173, climbing out at 42 800.
INTREPID Now are you happy?
INTREPID Hey.
INTREPID Helium pressure look good.
INTREPID I can move around a little bit more now.
It's lightning up.
INTREPID Okay, you've got a big job now. Don't
forget the ascent (garbled)
INTREPID (garbled) the second we lifted off.
INTREPID Okay, 5 minutes, Mark 5 minutes 3403,
156 feet now at 47 000.

CAPCOM Intrepid, Houston, you're looking good
at 5. The harbour master has cleared you into the main channel.
INTREPID Roger. Really getting down there.
PAO Now over 49 000 feet in altitude.
INTREPID Look at the lunar surface down there.
INTREPID Babe, 5 plus 30.
INTREPID Okay.
INTREPID mark. Man, look at that crater we're
flying over.
INTREPID Okay. (garbled) 500.
PAO Velocity 3800 feet per second.
INTREPID (garbled)
INTREPID Okay, (garbled) valve, if we got it.
INTREPID 1400 feet per second to go. Okay.
INTREPID Get a mark at 6 minutes.
PAO Coming up on 6 minutes.
INTREPID 6 minutes, 6 minutes 4382.
INTREPID Okay, I'd better get over on VERB 16,
NOUN 85 right now. This thing's running a little bit hot.
INTREPID Okay, 900 feet (garbled) to the AGS.
INTREPID Okay, (garbled) Sure picking up fast.
INTREPID Okay.
INTREPID 37.
INTREPID Okay.
INTREPID Measure a little bit more.
INTREPID Okay (garbled)
PAO 57 000 feet in altitude.
INTREPID Over 200 feet per second.
INTREPID 21 to go.
INTREPID 600 feet, now we've got 500 feet to
go. Wow, we're really bumping along.
INTREPID Five -
INTREPID 4W5.
INTREPID 139
INTREPID Perfect (garbled)
INTREPID Hold on, Pete.
PAO 5000 feet per second in velocity.
INTREPID Okay, main shutoff open.
INTREPID Okay.
INTREPID Open, open and go.
PAO Coming up on 7 minutes.
INTREPID Okay, going to close (garbled) B.
CAPCOM Looking good at 7.
INTREPID (garbled)
INTREPID Okay.
INTREPID We getting abort stage.
INTREPID Engine arm off, okay.
INTREPID Okay.
PAO We've had shutdown.

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0822, GET 142:00 448/5

INTREPID It's off 32 feet.
INTREPID (garbled) the thing right.
INTREPID Do you agree with that, Houston? Master
alarm, but I don't know from what.
INTREPID Everything looks okay.
INTREPID (garbled)
INTREPID I'll tell you what happened. I got
to watching that problem and I let her over steam.
INTREPID Yeah? Okay -
INTREPID (garbled) and I just figured we could
(garbled)
INTREPID Houston, how do you read?
CAPCOM Loud and clear, Pete.
INTREPID Okay, does that look satisfactory to
you?
INTREPID Looks good, Pete. We copied your
overburn and we see you're turning now.
INTREPID Okay -

END OF TAPE

CAPCOM stop in your overburn and we see you're turning now.

CLIPPER Okay, I took it all out. I've been interested in this (garble)

CLIPPER HL valve A indicated barber pole.

CAPCOM Roger, Clipper.

CLIPPER I tried - I recycled it twice, and shut off both ascent speeds and left the cross speed open. It is now, and I'm going to go low control, 2 up, at hold, there you are.

CAPCOM Okay.

INTREPID Inverter 2, inverter 1 open, then on inverter 2.

CAPCOM Intrepid, this is Houston. Press your engine stop push button.

INTREPID Yes. Sorry about that. Everything's off.

CAPCOM Okay.

INTREPID (garble)

PAO All 3 data sources show GO.

CAPCOM Clipper, Houston. We're setting up the relay now.

INTREPID I wonder why he's not transmitting VHF.

PAO You heard that report. There was a little bit of an overburn; it trimmed out very nicely, however. We're at 1

INTREPID Houston, Clipper is not reading your VHF; we're configuring from S-band relay now.

CAPCOM Intrepid, Yankee Clipper. How do you read Houston, now? We're in the relay mode.

INTREPID Hello Yankee Clipper, Intrepid, How do you read?

CLIPPER Intrepid (garble)

CAPCOM Intrepid, did you read Clippers answer?

INTREPID Yes, I read him.

PAO Preliminary numbers would show an orbit of 47 nautical miles by 9 nautical miles. Very close to nominal. We're at 142 hours, 16 minutes now into the flight.

CAPCOM Intrepid, Houston. Looks like you got a 47 by 8.8. Over.

INTREPID Roger.

INTREPID What were we targeting for?

CAPCOM Clipper, Houston. Give us POO and ACCEPT. We have an LM state vector for you.

CLIPPER Okay, Houston. You got it.

CAPCOM Roger. On the way.

PAO This is Apollo Control Houston, 142 hours 18 minutes now into the flight. A preliminary look at the burn status would indicate an overburn of some 1-1/2 seconds which was trimmed out by Commander Pete Conrad as he was removing his residuals from the burn. We're at 142 hours 18 minutes and this is Apollo Control Houston.

CAPCOM Intrepid, Houston.

INTREPID Go ahead.

CAPCOM Roger, Pete. Would you verify you're up on your forward VHF antenna? Break, Clipper, your computer's yours.

INTREPID We're up on VHF antenna.

CAPCOM Roger Pete.

PAO Apollo Control Houston. We presently show the lunar module, Intrepid, in an orbit of 47.1 nautical miles by 8.7 nautical miles with a velocity of 5504 feet per second. Intrepid once again in lunar orbit, once again a space faring vessel. Intrepid has now set sail for rendezvous. We're at 142 hours 21 minutes into the flight and this is ApolloControl Houston.

CLIPPER Houston, (garble)

CAPCOM We got it Dick. Go ahead.

CLIPPER Roger. I've got some torquing angles. You don't need them do you?

CAPCOM Negative. We don't need them.

CLIPPER You read that?

END OF TAPE

CAPCOM Negative we don't need it.
 INTREPID You don't need that?
 YANKEE CLIPPER That's affirm I'm reading you now Pete;
 loud and clear.
 INTREPID Okay; you be looking.
 CAPCOM Yankee Clipper; Houston.
 INTREPID Okay, Houston, you're looking at the
 DSKY there; the torquing angles.
 CAPCOM Roger; we're looking at them Pete.
 Sterling.
 INTREPID Okay, we're going to probe.
 CAPCOM Yankee Clipper, Houston; over.
 YANKEE CLIPPER Go ahead.
 CAPCOM Roger Dick; how about turning down your
 S band thumb wheel and make a VHF check and if you are in good
 shape on VHF, we're gonna break down this relay again.
 YANKEE CLIPPER They're checking now Jerry; I can hear
 them now.
 CAPCOM Roger.
 INTREPID Are you supposed to be on B right now;
 I'm supposed to be transmitting on A.
 PAO This is Apollo Control Houston at 142
 hours, 25 minutes into the flight. The Mission Control Center
 does plan to pass up an update pad for concentric sequence
 initiate the first maneuver and rendezvous, prior to LOS. We
 presently show 4 minutes and 30 seconds before LOS on the command
 module, Yankee Clipper and 5 minutes, 40 seconds on the lunar
 module.
 INTREPID Very good.
 INTREPID Break the hole to 351 feet a second,
 and 200 miles.
 YANKEE CLIPPER (garble) Pete.
 INTREPID Say again Dick.
 YANKEE CLIPPER I concur on the burn.
 INTREPID Okay, I'm just starting P20.
 PAO That was Pete Conrad reporting to Dick
 Gordon the range and range rate readings he had on his on-
 board display. In Mission Control Center, Houston, we are
 presently reading a range of 198 nautical miles, between the
 2 spacecraft, and a range rate of minus 331 feet per second.
 We are now at 142 hours, 28 minutes into the flight.
 INTREPID Intrepid - we are going to OMNI now.
 CAPCOM Roger Intrepid.
 CAPCOM Intrepid, Houston. You're about 45
 seconds from LOS. Intrepid, Houston. We'll see you at 143:16.
 INTREPID Roger.
 CAPCOM Intrepid, Houston. Your CSI DELTA V
 is going to be about 46.5; over.
 INTREPID Roger - 36.5.

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 1422200 CST 0844 450/2

PAO Apollo Control Houston. That was Jerry Carr passing up the Delta V for the first rendezvous maneuver. That was 46.5 feet per second. We managed to get it up in the nick of time just prior to Intrepid making its backside pass around the moon.

CAPCOM We got LOS on the Clipper and we'll see him at 13.

INTREPID Can you give us our AOS time?

CAPCOM Your AOS time is 143:16.

CAPCOM It's nominal.

INTREPID 143:16.

CAPCOM Roger. Nominal in the flight plan.

CAPCOM Intrepid, Houston. Go low bit rate.

PAO This is Apollo Control Houston at 142 hours, 31 minutes. We have had LOS with both spacecraft. Both Intrepid and Yankee Clipper, passing by the backside of the moon.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 08:59, GET 142:38:00 451/1

PAO This is Apollo Control, Houston at 142 hours, 38 minutes now into the flight of Apollo 12. Both Intrepid and Yankee Clipper passing above the far side of the moon out of acquisition range with Mission Control Center, Houston. Ground solution continues to show a forecast time of ignition for the concentric sequence initiate maneuver of 143 hours, 1 minute, 51 seconds. You heard the DELTA-V for this maneuver passed to Intrepid just prior to going out of acquisition. That DELTA-V, 46.5 feet per second. We're at 142 hours and 39 minutes now into the flight, and this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 143 hours, 14 minutes now into the flight. We're less than 2 minutes away now from reacquiring Yankee Clipper as it emerges from around the far side of the moon. A report from our Science Staff Support Room indicates that the magnetometer and seismometers both had readings from Intrepid at liftoff. Presently, ground based solutions in the Control Center indicate that a constant DELTA height at burn of some small magnitude may be accomplished or done on this front side pass. We won't know, of course, until we reacquire Intrepid and get their CSI solution. Ground computations would indicate a burn, a constant DELTA height burn at 143 hours, 59 minutes, 53 seconds with a DELTA-V of perhaps 12 to 14 feet per second. This would be done to fine tune or smooth out the wrinkles in the orbits of the two spacecraft. Intrepid traveling some 15 nautical miles below playing catch up. While Intrepid is playing catch up with Yankee Clipper the individual tasks for Conrad and Bean are probably divided along these lines. Conrad operating the radar and the DSKY during thrusting programs and making automatic or manual attitude changes. Bean logging all maneuver solutions and systems performance and operating the DSKY except when keyboard entries affect control of the spacecraft after thrusting. We have acquisition with Yankee Clipper. No conversation taking place at this time, however. We'll stand by at 143 hours, 16 minutes. We're 2 minutes, 25 seconds away of reacquiring Intrepid.

CLIPPER Okay, (garbled) we're going to have a plane here for you.

CAPCOM Yankee Clipper, Houston. How do you read?

CLIPPER Houston, Clipper. Loud and clear.

CAPCOM Roger.

CLIPPER Roger, CSI burn was good, Intrepid burn 45.3 feet per second, (garbled) was 45.9.

CAPCOM Roger, Dick.

PAO That was Dick Gordon reporting the concentric sequence initiate burn was good. We're at 143 hours, 18 minutes. When we reacquire Intrepid we'll probably receive a status report on that burn. This is Apollo Control, Houston continuing to monitor.

CLIPPER Hey, Pete, your flight change is minus 4 tenths.

PAO Now processing data on Intrepid, the lunar module.

CAPCOM Intrepid, Houston, how do you read?

INTREPID Loud and clear, Houston.

CAPCOM Roger, Al. Read you the same.

INTREPID Residuals PGNCs were plus 1 tenth,

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 09:36, GET 143:14:00 452/2

INTREPID minus 1 tenth and minus 3 tenths.
CAPCOM Intrepid, Houston. We'd like to know
what your DELTA-V's were that you loaded.
INTREPID What do you mean, my DELTA-V's we
loaded. We loaded 45.3 feet per second. Is that what you
mean?
CAPCOM Affirm.
INTREPID How was our CSI solution?
CAPCOM Okay.
INTREPID Okay, and I've run CDH here, and it
looks like minus 9 and minus 8 roughly, showed me 59 seconds
early at TPI.
CAPCOM Roger.
INTREPID And we're not going to make the system
look like we used to make the out of plane. We are down in
a noise level on out of plane. It's going 4 tenths of a foot
per second, and I haven't looked at it yet, but I will in a
minute.
CAPCOM Roger. Intrepid, Houston. Can you give
us high bit rate, please?
PAO This is Apollo Control, Houston at
143 hours, 21 minutes now into the flight. We presently
show Intrepid and Yankee Clipper at a range of 310 nautical
miles with a range rate of minus 75 feet per second.
INTREPID Say, Houston, I sure do enjoy flying
this thing. Both the ascent and the descent stage are both
nice.
CAPCOM Roger, Pete.
INTREPID For - for your information I brought
that on the TSI burn, and that pretty evened me up, and I
also switched my DAP load to system A.
CAPCOM Roger, copy.
INTREPID And my out of plane shows .31 miles
and 3 tenths of a foot per second, so I think we'll forget
it.
CAPCOM Okay, Pete. That sounds good. While
you got a minute, we had a question about the sequence
camera. Did that camera stop right after liftoff?
INTREPID Apparently it did, then it stopped
again several times. That's affirmative. It stopped, and
I started it, and it stopped 2 or 3 times.
CAPCOM Roger.
INTREPID Hey, against somebody else's - anybody
else had to use these window heaters before? Our windows
keep fogging over, and I have to run the window heaters
all the time.
CAPCOM Intrepid, Houston. The folks here say
that was pretty nominal on Apollo 11.
INTREPID Oh, I didn't remember that. Okay, very
good.

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 09:36, GET 143:14:00 452/3

CLIPPER Hey, Pete.
INTREPID Go ahead, Dick.
CLIPPER My CDH time on my computer is 14359467047 -

END OF TAPE

INTREPID 14359 46.47.
INTREPID Okay, we are within a couple - about
15 seconds of one another.
YANKEE CLIPPER Okay (garbled) yours.
INTREPID Okay, 1240001.53.
YANKEE CLIPPER I got it, thank you.
CAPCOM Intrepid, Houston.
INTREPID Go.
CAPCOM Roger, Pete, I sent you bum dope. 11 did
not use their heaters.
INTREPID Okay. I don't remember anybody having
to use them and both my docking window and both Al's window
and my window, we collected moisture on the lunar surface
and we've been collecting it twice in here putting the window
heater back on.
CAPCOM Roger.
PAO Just prior to this call up from Mission
Control you heard Pete Conrad and Dick Gordon comparing
onboard computation numbers for CDH, the constant DELTA Height
maneuver. We're at 143 hours 26 minutes now into the flight,
and this is Apollo Control Houston.
INTREPID I sure do apologize, Houston, for the
overburn. I got my head looking at Al there and shut her
off late.
CAPCOM Roger, no sweat, Pete.
YANKEE CLIPPER What did you do this time, Pete?
INTREPID Say again.
YANKEE CLIPPER What (garbled) did you do this time?
INTREPID I didn't do anything. We had one main
shutoff valve (garbled) barber poled over here, and it turned
out to be an indicator, but I got interested in that and I
didn't dearm the engine soon enough and we shut down about
30 feet per second over. (garbled) had to back her out.
No big deal.
PAO We presently show Intrepid and Yankee
Clipper 126 nautical miles apart. We're at 143 hours 28 minutes
now into the flight.
YANKEE CLIPPER Okay, Pete, my first (garbled)
INTREPID And what?
YANKEE CLIPPER (garbled)
INTREPID Okay, Dick, you're almost unreadable.
CAPCOM Clipper, Houston, your S-band is getting
pretty ratty.
INTREPID Okay, Dick, I'm still on 17.6. Are
you looking at the recycle on the DSKY, Houston?
CAPCOM We're checking, Pete.
INTREPID It's minus 10 and minus 8.8.
CAPCOM Intrepid, Houston, we're watching.
INTREPID I finally got a visual on Yankee Clipper
I think.

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 0947 GET 143:25 453/2

CAPCOM Roger.

INTREPID Yes, I got you visually, Yankee.

YANKEE CLIPPER (garbled)

INTREPID Okay, I show 122 on mine, closing at

95 feet a second.

PAO That was Pete Conrad reporting he thought he had a visual sighting of Yankee Clipper. The two spacecrafts presently 122 nautical miles apart. We are at 143 hours 32 minutes into the flight.

YANKEE CLIPPER (garbled)

INTREPID (garbled)

YANKEE CLIPPER (Garbled)

END OF TAPE

INTREPID (Garble). (Garble) (Lot of static) that
OMNI PPI (garble). Hey, I saw your flash down there. (garble)
Pretty close to that RIB.

INTREPID (Garble).

INTREPID (Garble).

PAO. This is Apollo Control, Houston at 143 hours
37 minutes now into the flight.

INTREPID Al's working so hard keeping his AG's updated
here why don't we let him burn CDH.

CAPCOM Roger, Pete.

INTREPID Break gate there.

CAPCOM Intrepid, Houston. Standby on that. We're
consulting our oracle right now.

INTREPID I warned the kid, but he's all over the cock-
pit must have been raised in range rate A.

INTREPID Is this the 21st?

PAO That was Pete Conrad coming to Mission Control
with the suggestion that they do their CDH or Constant
Delta Height maneuver, utilizing the AGs or the secondary
guidance system. The point he made was that Al Bean was all
over the cabin constantly updating their AGs numbers from
the PNGS and I guess he thought why not use them. Presently
we're showing Intrepid and Yankee Clipper 115 nautical miles
apart. This through our displays, taking it over the shoulder
look at Intrepid's computer readouts. We're at 143 hours
39 minutes.

INTREPID Okay, I'm minus 6.3. Mike you've got 2-1/2
minutes early.

INTREPID Okay.

CONRAD Say, Houston. With - your concurrence - we'd
like to go over into the cabin mode for a while (garble)
cabin mode and try to get rid of some of this dirt before
we dock.

CAPCOM Roger, Pete. Standby. Catch up at Houston.
Go ahead, use the cabin mode.

CONRAD Canisters (garble) Yeah, okay.

CAPCOM Intrepid, Houston. I've a PIPPA bias update
reading for you.

INTREPID Okay. Go ahead.

CAPCOM Okay. VERB 21 NOUN 01 ENTER 1452 ENTER 77423
ENTER ENTER 1454 ENTER 00406 ENTER ENTER 1456 ENTER 00777

ENTER. Over.

INTREPID Okay, let me see if I got those numbers all
right, VERB 21 -

END OF TAPE

INTREPID Look, I want to see if I got those numbers alright.
VERB 21, NOUN on 1 ENTER, 1452 ENTER, 77423 ENTER ENTER 1454 ENTER
00046 ENTER ENTER 1456 ENTER 00077
CAPCOM Intrepid, Houston. That's negative. Address
1454 should read 00406 and address 1456 should read 00777. Over.
INTREPID Okay, 1454 is 00406 and 1456 00777.
CAPCOM That's affirmative, Pete.
INTREPID Hey Al, have you (garble)
CAPCOM Yankee Clipper, Houston. Over.
CLIPPER Go ahead, Houston.
CAPCOM Roger. I've got some high gain angles for you
Dick.
CLIPPER Go ahead (garble)
CAPCOM Roger. Pitch is minus 23 and YAW is plus 171.
Over.
CLIPPER And we're on high gain.
CAPCOM Roger.
CLIPPER (garble)
CLIPPER Okay.
PAO This is Apollo Control Houston. We currently
show the 2 spacecraft at 103 nautical miles apart.
CAPCOM Yankee Clipper, Houston. We're going to have
a handover here now, in your case from Honeysuckle to Madrid. Over.
At 14350.
CLIPPER Okay. Very good.
That's the way the world turns. (garble)
PAO This is Apollo Control Houston. Meanwhile in
the Control Center we have the ignition clock counting down for
CDH. We show 10 minutes and 30 seconds until time of ignition.
We're at 143 hours 50 minutes now into the Flight of Apollo 12.
CLIPPER Okay (garble) I just fired one.
CAPCOM Yankee Clipper, Houston. You read through
Madrid?
CLIPPER Hello, Houston. Clipper (garble)
CAPCOM We read you the same.
CLIPPER Hurry, hurry, hurry. (garble)
INTREPID Okay, here's my solution (garble)

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1434500, CST 1007 455/2

CLIPPER 10.3 0 and 7.0 10.0 and (garble) 5.3 (garble)
INTREPID Wait Dick. Call Houston and have them relay it to
me. I can't understand you.
CAPCOM Clipper, Houston. Go ahead.
CLIPPER It's okay, go ahead.
CLIPPER Hey, Gerry, do you agree with my solution?
CAPCOM Roger. Break, Pete. Clipper says he agrees
with your solution.
INTREPID Okay, very good. And Gerry, tell them that
our NOUN 81 was - where did you put it Al? Minus 10.7 or is
that 2, minus 10.2 and minus 9.3.
CAPCOM Roger. Copy. NOUN 81 minus 10.2 and minus
9.3.
INTREPID Roger.
CLIPPER Roger.
INTREPID That's affirmative.
CAPCOM And Clipper Roger'd that. He heard it.
INTREPID You got any thoughts on the ground, Houston,
why our COMM is so bad between each other?
CAPCOM Pete, we're checking. Break. Did you get an
out-of-plane from Dick.
INTREPID - how we can fix it.
INTREPID We don't have any out-of-plane (garble)
INTREPID That was 0.4 Pete.
CONRAD Oh, 0.4 of a foot per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 1435500 CST 1017 456/1

CAPCOM Clipper; Houston.
YANKEE CLIPPER Go ahead Houston; this is Clipper.
CAPCOM Roger: just thought we'd better make
a check with you; see how your antennas are; are you in the
starboard antenna?
YANKEE CLIPPER Absolutely. Lower antenna, lower right.
CAPCOM Roger.
YANKEE CLIPPER The VHF is really horrible.
PAO This is Apollo Control, Houston; the ignition
clock in Mission Control shows now less than 3 minutes from
time of ignition for CDH, constant DELTA height maneuver.
Two minutes now away from CDH. This -
BEAN Are you going to burn?
CONRAD You're right Al; I picked it up on the
sextant.
PAO Less than a minute away now.
INTREPID It's smaller than the LM.
INTREPID I'm with you.
INTREPID Let me know if I can help you.
INTREPID Do you want to count now?
PAO Guidance says they are burning now.
BEAN Okay, Pete.
PAO Burn is concluded.
CONRAD - Houston.
CAPCOM Roger Pete. Looks good.
INTREPID Okay. ITPI time was 144:34:54:87; that's
pretty good.
INTREPID 144:34:54:87.
INTREPID Roger; 144:34:54:87.

END OF TAPE

PAO This is Apollo Control, Houston at 144 hours, 5 minutes now into the flight. We presently show Intrepid and Yankee Clipper some 80 nautical miles apart.

INTREPID Okay, I'll pick up on myself right here. Yes sir.

PAO This is Apollo Control, Houston. We're at 144 hours, 10 minutes now into the flight. We presently show Intrepid and Yankee Clipper at 74 nautical miles apart with a closure rate of 141 feet per second.

CLIPPER PIS time of 144362024.

INTREPID That's affirmative. 28.5 for DPI.

CLIPPER I was 4 seconds off.

PAO You've been -

INTREPID Easy.

PAO You've been listening to Intrepid and Yankee Clipper discussing their terminal phase initiation solution.

PAO The TPI, terminal phase initiation burn is one which effectively begins the intercept. It's done some - when the phasing between the two spacecraft is some 26 1/2 degrees from the local horizontal. We're at 144 hours, 13 minutes now into the flight. This is Apollo Control, Houston.

INTREPID You get your line on again? Hey, Pete?

INTREPID Okay. The blasted sun out there is making it very difficult to take marks. I got a 5 of them; 6 of them so far.

CLIPPER Good thing it doesn't bother the VHF any. I said it doesn't bother the VHF any.

INTREPID Okay.

CLIPPER You guys got something flying along with you. Could be.

CLIPPER Hey, would you guys check your turner lights? It's dark out there. I don't see you anymore. Well, I'll just keep looking here. Just hang on. I sure don't see you.

INTREPID I wonder why you lost it. It was really great there the first night side pass.

CLIPPER Well, you're gone, Pete. I'll have to back you up on VHF 7 marks.

PAO This is Apollo Control, Houston. We're at 144 hours and 20 minutes. Momentarily, Capcom Jerry Carr will pass along to the crew A ground - -

END OF TAPE

PAO Momentarily CAPCOM, Jerry Carr, will pass along to the crew a ground based solution of a - for TPI.

CAPCOM Houston, we have a TPI solution here.

INTREPID All right, we're ready to copy.

CAPCOM Okay, take it 144 35 52 we're getting a Delta VX of 25.9 a Delta VZ of minus 12.8. Your total Delta V is 3.0.

INTREPID Roger, that's very close. Our first cut was a V total of 28.9.

CAPCOM Roger.

INTREPID Hey, Jerry what happened to your off plane solution?

PAO This is Apollo Control, Houston. That TPI maneuver information is passed along for advisory purposes only. The crew, of course, does have the option of going with -

CAPCOM And we're seeing about 8 feet per second but we don't believe it.

INTREPID Uh, okay. We don't either. I bet he had to have something somewhere. Hey, you ought to see the Earth in the telescope, Pete, it's fantastic.

PAO Intrepid, of course, has the option of going with the onboard solution. The TPI maneuver will be performed -

CAPCOM Are you in the sextant?

PAO Well, Intrepid and Yankee Clipper.

CAPCOM The lights are just not blinking that's all.

INTREPID All right, Houston, it looks like our tracking lights burned out. Dick hasn't been able to find us in this sextant and on the first nightside pass we had little bits and pieces floating along with us and we could tell that the tracking light was flashing on them and we still have I've presumed today, fifty pieces floating along and nothings flashing on them so I'm pretty sure its burned out.

CAPCOM Roger, Pete.

PAO TPI has performed over the backside of the moon or the far side pass.

CAPCOM Hi, Intrepid this is Houston. How'd your sweep DOWN FORE and AFT go?

INTREPID It's getting much cleaner in here running this way and also. Yankee Clipper informs me he has the television all set up when we come around the Horn, we'll come around with the television on in VOX.

INTREPID Roger. Who knows you may get to see the first whifferdill.

CAPCOM Roger, Pete. Our electrical watchers say that the current indicates that your tracking light is on.

INTREPID Okay now we just turned it off. Now does the current show that?
CAPCOM It - it sure does, Pete.
CLIPPER They're flying through the air backwards, Pete, because I don't see it.
INTREPID Well, my ball tells me I'm pointed at you Dick and so does my radar.
CLIPPER Well, you may have current, but you don't have any lights.
INTREPID Maybe that thing can burn out in such a manner that it still draws current but that doesn't make sense does it?
CAPCOM That's affirmative, Pete.
INTREPID Why, it can do that?
CAPCOM Yes, it can.
INTREPID Well, I'm pretty sure it's burned out I don't see a flash anywhere in the spacecraft not that I remember seeing it before but I did remember on bits and pieces and I don't see it anymore. When's LOS, Houston.
CAPCOM We've got LOS coming up for both of you in three minutes.
INTREPID Okay, very good.
CAPCOM You're only about 10 seconds apart.
INTREPID Okay.
PAO This is Apollo Control Houston. 144 hours 25 minutes. We presently show INTREPID and YANKEE CLIPPER 53 nautical miles apart with a rate of closure of 136 feet per second. We've got some 2 minutes and roughly 2-1/2 minutes before we have loss of signal on both vehicles. We're at 144 hours 26 minutes now into the flight and this is Apollo Control, Houston.
INTREPID Okay, I've got a recycle going.
CAPCOM Okay, Pete, thank you.
CAPCOM Yankee Clipper, Houston roll low bit rate, pass that word on to the LM.
INTREPID (Garble) (Too faint)
PAO This is Apollo Control, Houston at 144 hours 28 minutes into the flight of Apollo 12. We've had loss of signal with both Intrepid and the Yankee Clipper.

END OF TAPE

PAO This is Apollo Control at 145 hours 13 minutes now into the flight. We are some 1 minute and 20 seconds away at this time from reacquiring the command module Yankee Clipper. As the 2 spacecraft come around the far side of the moon, the Yankee Clipper will be configured for television to show the final phases of rendezvous and docking. Meanwhile, we have been furnished some numbers by the Houston television pool which indicate in addition to US networks the Atlantic and Indian Ocean satellites are covering a total of 32 countries with a potential audience of some 300 million persons. The Japanese news pool, also by satellite transmission has a potential of 100 million persons. Line coverage is being transmitted to the Phillipine Islands, Hong Kong, Hawaii, Korea, Australia, and Tiawan. In addition to that, tapes are being flown to African and the Middle East with a potential viewer count of 6 million persons. We're 10 seconds away now from forecast time of acquisition and we'll stand by.

YANKEE CLIPPER Hello, Houston, Yankee Clipper loud and clear. How me?

CAPCOM Roger, the same.

YANKEE CLIPPER What's new?

CAPCOM Nothing yet, Dick.

YANKEE CLIPPER Okay, I'll try and roll a little more and give you some more high gain.

CAPCOM Houston -

INTREPID 38 feet per second.

CAPCOM Clipper, Houston. We're going to need about a 60 degree right to get high gain.

PAO Pete Conrad reporting a closure rate of 38 feet per second, about 1.7 nautical miles away. 145 hours 16 minutes, standing by for any television transmission.

YANKEE CLIPPER Pete, I have you at 1.2 miles.

INTREPID I concur.

PAO Now 1.2 nautical miles apart.

YANKEE CLIPPER Boy, you sure look strange down there among all the sand dunes.

INTREPID Sorry about that.

YANKEE CLIPPER One mile, and I'm (garbled) at 31 feet.

PAO One mile apart at a closure rate of 31 feet per second.

INTREPID Hey, 1 mile I got you at.

YANKEE CLIPPER (garbled)

PAO Television signal just beginning to come in now. We're standing by.

CAPCOM Clipper, Houston, we're getting your TV black and white now. Processing will be along shortly.

YANKEE CLIPPER Okay, how does it look?

CAPCOM Looking good in black and white and we think we can see Intrepid.

YANKEE CLIPPER Okay, how does it look?
 CAPCOM Looking good in black and white and
 we think we can see Intrepid.
 YANKEE CLIPPER 55 - 40 500 feet at 30 feet a second.
 CAPCOM Roger.
 INTREPID Hold off a little more. Post down.
 INTREPID Huh?
 INTREPID Looks post down, he's 40 000 feet away.
 YANKEE CLIPPER (garbled) in case I have to break for
 you.
 YANKEE CLIPPER Hey, Pete, you're looking pretty good.
 I've got you at 6/10 of a mile.
 INTREPID Yes. Okay. About (garbled) a half a
 mile here, and forward down.
 INTREPID Better run through that secondary
 cannister for a while. It's just - I don't know, it doesn't
 smell too good, either. That's a problem. Both to secondary?
 INTREPID All right. At half a mile, 19 feet a
 second.
 YANKEE CLIPPER I check (garbled)
 INTREPID (garbled)
 INTREPID (garbled)
 INTREPID You look pretty darn good yourself.
 (garbled) 2000 feet.
 CAPCOM Clipper, Houston. We've got good
 color now. Looking good.
 YANKEE CLIPPER Okay, Pete, I've got you at 1/3 of a mile.
 2000.
 INTREPID Okay.
 YANKEE CLIPPER Looking good.
 YANKEE CLIPPER How can you look so good if you're so
 ugly?
 INTREPID Say again.
 YANKEE CLIPPER How can you look so good when you're so
 ugly?
 INTREPID I don't know. You look awfully good
 yourself.
 PAO There you see Intrepid as it approaches.
 INTREPID 1500 feet, Dick.
 YANKEE CLIPPER Okay.
 CAPCOM Intrepid, Houston, give us high bit
 rate, please.
 INTREPID Okay, Houston.
 INTREPID 8 feet a second at 1200 feet. Clipper -
 (garbled) out there when you give maximum thrust.
 INTREPID Yes.
 INTREPID 5 feet a second.
 YANKEE CLIPPER Okay, Pete, you're looking good. Keep
 'um coming.
 INTREPID Okay.

INTREPID (garbled) feet.
INTREPID Let her coast in.
INTREPID Antenna is in now.
INTREPID Huh?
INTREPID I'm punching this antenna. Okay right

now.

PAO Intrepid coasting in now. Dick Gordon,
aboard the Yankee Clipper, will actually perform the docking.

YANKEE CLIPPER Exterior light off. It's off.

YANKEE CLIPPER On the aft. (garbled) left.

INTREPID On the aft is to (garbled)

YANKEE CLIPPER Say again.

INTREPID (garbled)

YANKEE CLIPPER Yes, I got 800.

INTREPID Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 14522 CST 1145 460/1

INTREPID You're looking better all the time
Yankee.
YANKEE CLIPPER Yeah, keep going; I still have some film
left.
PAO Pete Frank going around the room pulsing
his flight control team as to status; we are looking good at
this time.
INTREPID 500 feet.
YANKEE CLIPPER Check (garble) 540.
INTREPID Okay, I'm down to 3 feet a second.
YANKEE CLIPPER Is your tracker light on?
INTREPID No, I'm going to turn it on for you.
YANKEE CLIPPER You don't have one.
PAO Closure rate of 3 feet per second.
INTREPID Two feet a second Dick. Doing it neat.
PAO 200 feet apart now.
INTREPID Okay, the radar broke lock A1; would you
take care of it? I'll go to the check list.
INTREPID Okay.
INTREPID How do you read me Dick?
YANKEE CLIPPER I read you loud and clear Pete; you look
awful good.
YANKEE CLIPPER How come you didn't bring the docking
target back with you?
INTREPID Say again.
YANKEE CLIPPER How come you didn't bring the docking target
back with you?
INTREPID You're almost unreadable. Relay through Houston.
CAPCOM Roger Intrepid. He wants to know why you
didn't bring the docking target with you.
INTREPID Oh, I got it. On the top. Pete?
INTREPID Yeah.
INTREPID We're gonna stop right there.
INTREPID Yeah, 3400 -
INTREPID Okay, we're at 3400
INTREPID Enter -
INTREPID Let me put down that number.
INTREPID Might be a good little number.
YANKEE CLIPPER Hello Houston; Clipper.
CAPCOM Clipper, Houston; go. We can see
thrusters firing now.
CLIPPER Okay; MI PLSS with plural arm.

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 14522 CST 1145 460/2

CAPCOM You're GO for logic -
INTREPID And I'll have a logic on for you in a
minute.
INTREPID Okay, here's the logic.
INTREPID Right there.
CAPCOM Clipper, Houston. You're GO for pyro
arm and stand by to receive the skipper's gig.
YANKEE CLIPPER Aye, aye, sir.
INTREPID Okay, Pete; why don't you let me finish
this roll, huh?
INTREPID Do your what?
INTREPID Let me finish this 180 degree roll; okay?
YANKEE CLIPPER I don't understand what he's saying Al;
do you understand?
CAPCOM Intrepid, Houston. He's going to finish
his roll maneuver now.
INTREPID I'm looking at it.
INTREPID All right. That's a trick. 2 roll Dick,
and all -
INTREPID (garble)
INTREPID Huh?
INTREPID Okay, look at the umbilical cover; do
you suppose that's what got hit by lightning or something?
What's made it brown? Look at the top of it; it's burned.
INTREPID Yep, I do believe that's what hit.
INTREPID Nope; maybe it gets burned by other -
INTREPID Maybe we better find out; over.
INTREPID Why don't you move over to the left a
little bit and I'll take a picture of it and we'll look at it
later.
YANKEE CLIPPER (garble) down roll some Pete?
INTREPID Can I do what?
YANKEE CLIPPER Drop down?
INTREPID Down.
INTREPID Yeah.
YANKEE CLIPPER Towards the moon.
INTREPID Towards where?
YANKEE CLIPPER Towards the moon.
INTREPID Oh yeah; okay. How much farther down
you want me to go?
YANKEE CLIPPER Well, go down so I can see you; I've
lost - I'm losing you now.
INTREPID You don't have me?
YANKEE CLIPPER Naw - get down towards the moon; you're
going below me - below the spacecraft.
INTREPID Oh, I think he wants me to - that's
right - oh, I'm sorry, when you say "down" - that's up to me
pal, I'm upside down.
YANKEE CLIPPER I said towards the moon.
INTREPID Sorry, I don't know where the moon is;
I just -
YANKEE CLIPPER It's right there.

INTREPID Now you see me?
yankee clipper Okay. Oh, I got you.
INTREPID Okay.
YANKEE CLIPPER You come right on over.
INTREPID All right; let me stop my radar - have
you got it?
YANKEE CLIPPER I've got it.
INTREPID You've got it. Okay, you need to pull
both rendezvous circuit breakers.
INTREPID Okay, wait just a second. Is the
rendezvous radar in the right place?
YANKEE CLIPPER 320 - zero 320, which is where it should
be.
INTREPID Okay. Got those out. Rendezvous
radar breakers are full with the VERB 44.
CAPCOM Intrepid; Houston. When you get a
chance, we would like that picture.
INTREPID He took it already Houston.
CAPCOM Good show.
INTREPID Started to take it with the movie
camera, but - hey, he's got something sticking out around the
top of it too, you ought to take a look. Right up there?
INTREPID On the top?
INTREPID Wait a minute; let me check on my
check list here.
INTREPID All right.
INTREPID Hey, overhead window. Read me the rest
of that Al.
BEAN Okay. Turn the lighting to DOCK.
CONRAD Okay.
BEAN And - that's it.
CONRAD Okay -
BEAN No, wait. Why don't you take a look at
whatever is swinging on top of the spacecraft; see it? It's
probably part of the SEP package.
CONRAD I bet it is. I bet you're right. Back
to back.
INTREPID Get a picture of that?
INTREPID I tried to.
INTREPID All right; since I'm going to pitch over
90 degrees now.
YANKEE CLIPPER Okay, let's go.
INTREPID Houston?
CAPCOM Roger Intrepid.
INTREPID Let me have this one.
INTREPID - nouns. (garbled) antenna okay.
(garble)
CAPCOM Intrepid; Houston. Give us low bit rate.

END OF TAPE

INTREPID (garbled)
CAPCOM Intrepid, Houston, give us low bit rate.
INTREPID Okay, Dick, now I'm going
to yaw left 120.
YANKEE CLIPPER Okay, go ahead, over.
INTREPID Okay.
INTREPID (garbled)
YANKEE CLIPPER (garbled)
INTREPID Okay.
INTREPID (garbled)
INTREPID Okay, Dick, (garbled)
YANKEE CLIPPER I got (garbled) but I'll do it again.
INTREPID (garbled) After a hard dock, both
controls modes off. Okay?
INTREPID After the hard dock.
INTREPID Yes.
INTREPID (garbled) down there.
INTREPID (garbled)
PAO Intrepid now stationkeeping with Yankee
Clipper. We're at 145 hours and 34 minutes.
INTREPID (garbled)
YANKEE CLIPPER I want your picture taken instead.
INTREPID Okay.
YANKEE CLIPPER Hey, we're looking good and closer.
Right on the button.
INTREPID Okay. Looks good here.
INTREPID Okay.
INTREPID (garbled). Looks good.
INTREPID That a boy. (garbled) Up a little
bit. Looks good, Dick.
intrepid (garbled)
INTREPID Got capture?
YANKEE CLIPPER Capture.
INTREPID Okay, go free.
YANKEE CLIPPER Free.
INTREPID Very good. (garbled)
INTREPID Go ahead (garbled)
YANKEE CLIPPER That's what there was supposed to be,
wasn't it, free?
INTREPID Yes sir, you're looking good. Stable
as a rock. Go ahead.
YANKEE CLIPPER Wait a minute, just let me stabilize a
little bit.
INTREPID Okay, it looks pretty stable to me.
YANKEE CLIPPER Think so, huh?
INTREPID Huh?
YANKEE CLIPPER I want to put you down just a little bit.
INTREPID Oh, okay. Let the dynamics die out just a little.

INTREPID Okay. It's hardly moving at all.
YANKEE CLIPPER With this target I want to be (garbled)
down a little bit.
INTREPID Okay. Steady as a rock.
YANKEE CLIPPER Okay, I'm getting it down there with
the attitude. It's okay. Okay?
INTREPID Go ahead.
YANKEE CLIPPER Are you ready to return?
INTREPID I'm ready to retrack.
YANKEE CLIPPER Okay, Charlie Brown, here you go.
INTREPID Okay.
YANKEE CLIPPER And you're home free, boys.
INTREPID Both drogue latches are out, pal, and
you got it.
YANKEE CLIPPER Thank you, thank you.
INTREPID Super job that you did. That was cool,
wasn't even a ripple. Okay, give me the checklist here,
INTREPID Al?
INTREPID Okay, mode control attitude hold, AGS
at hold. Attitude control (garbled) Guidance control AGS
INTREPID Guidance control AGS deadband max.
INTREPID Deadband max. (garbled)
INTREPID Alan couples on.
INTREPID Verify forward dump valve
auto.
YANKEE CLIPPER Houston, Clipper.
CAPCOM Clipper, Houston. Go.
YANKEE CLIPPER Roger, that's the end of the TV show.
We've got some work to do.
CAPCOM Roger. We can see Pete through the
window now.
YANKEE CLIPPER Yes, I'll leave it on for a little while
then.
INTREPID Hello there.
INTREPID We've got a 120 (garbled)
CAPCOM Roger, Pete, we can see your nose
from here.
INTREPID That's my sun glasses I've got on in
my helmet.
INTREPID 1202 mark.
CAPCOM Intrepid, Houston. I've got some S-band
angles for you.
INTREPID The marines are picking on us again.
CAPCOM Intrepid, Houston, negative on the
angles.
INTREPID Go ahead.
INTREPID Okay.
YANKEE CLIPPER Houston, I've got 5838 for the LM weight,
35 389 now for the CSM weight. (garbled)

CAPCOM Stand by, Pete.
INTREPID Those are blank on my checklist, so
I'm -
INTREPID I believe you're right. I believe I
can (garbled) right on the -
INTREPID Well, I'm not sure that (garbled)
INTREPID Where are you going to, Richard?
YANKEE CLIPPER I'm just wondering, Pete. I've got it
in 10 degree deadband (garbled)
INTREPID Okay.
CAPCOM Intrepid, Houston, I got your weight.
INTREPID Right, Houston, go ahead.
CAPCOM Okay, LM weight is 5334, and CSM
weight is 35 600.
INTREPID Copy, LM weight is 5334 and CSM is
35 600. Very good.
CAPCOM Roger, Clipper, did you copy?
YANKEE CLIPPER Houston, I just took 5500 for the LM.
Is that close enough?
CAPCOM Clipper, the LM weight is 5334 and if
you're ready to copy I've got your trim for you.
YANKEE CLIPPER Listen, I don't really need those things,
do I?
CAPCOM Okay, we'll skip them.
YANKEE CLIPPER Hang on to them in case we need them,
though, Jerry. I've got to get to work and get that tunnel
pressurized.
CAPCOM Roger, do a half a degree deadband.
YANKEE CLIPPER I'm in plus or minus 5 degrees. I
can see some fuel that way.
YANKEE CLIPPER Houston, Clipper.
CAPCOM Clipper, Houston, go.
YANKEE CLIPPER I expect the folks are a little bored
with that scene now. I'll turn the television off with
your concurrence.
CAPCOM Roger, we concur.
YANKEE CLIPPER How was the show?
CAPCOM Very, very good, Dick.
YANKEE CLIPPER Okay, the TV is off.
PAO this is Apollo Control Houston. The
television transmission is now null. We copied preliminary
docking time of 145 hours 36 minutes, and you heard Pete
Conrad commend command module pilot Dick Gordon for what
he described as a super job. We're at 145 hours 42 minutes
and this is Apollo Control Houston.
CAPCOM Intrepid, Houston, go up data link
to data. Your S-band antenna angles are pitch 176, yaw 59.
INTREPID Houston, Intrepid. (garbled) forward
dump in auto? Okay.
CAPCOM Yankee Clipper and Intrepid, we're
ready to start uplinks to you. Who would like the first one?

END OF TAPE

INTREPID Okay.
 CAPCOM Yankee Clipper and Intrepid we're ready to
 start uplinks to you. Who'd like the first one?
 CLIPPER Yeah, Clipper is ready.
 CAPCOM Roger, give us who and we'll start it out.
 CLIPPER It's all yours.
 CAPCOM Intrepid, Houston, high bit rate.
 CAPCOM Intrepid, Houston. Give us a high bit rate,
 Over.
 INTREPID Roger, we'll give you a high bit rate.
 INTREPID We gave it to you Houston but you did not
 catch it.
 CAPCOM Roger we copy now.
 INTREPID Say, Houston, Intrepid, what time is it back
 there anyhow?
 CAPCOM It's just about high noon. It's 9 minutes
 after 12.
 INTREPID Oh, I - I've completely lost all sense of
 night and day. Al said, Al wants to know what day it is.
 CAPCOM 20 November, 20, and it's Thursday.
 INTREPID Okay. Thursday, Roger.
 CAPCOM Intrepid, Houston if you'll go P00 on data
 we've got an uplink for you and Go up data link to data.
 Over.
 INTREPID You got it, Houston.
 CAPCOM Clipper, Houston. The computer's yours.
 CLIPPER Say, Houston while you got a minute I'd like
 to talk over something with you.
 CAPCOM Go ahead, Pete.
 INTREPID When we were on the backside then coming around
 I don't remember exactly what time it was, coming up onboard
 on a mid course correction, we got an EGS light with a partial
 pressure CO2 and went over to seven. and that kind of surprised me,
 and we did switch the canister secondary and sure enough this
 CO2 gauge went to zero and like it was starting on a fresh
 canister. I don't think the canister that we put in, which was at
 130 hours, that's only 15 hours old, should have done that. I'm
 wondering if maybe I ought to take a look at that canister and see
 if it's wet or anything.
 CAPCOM Roger, Pete. Standby. I think we've got some
 words on that.
 INTREPID Okay. (Garble) take the hatch out. Is that
 what you said, Dick, we can open the hatch? (Very, very faint
 voices in background).
 CAPCOM INTREPID, Houston, the computers yours.
 INTREPID Roger.

CAPCOM Yankee Clipper, Houston. Got a CSM separation
 maneuver PAD for you and a LM jettison attitude and a LM
 jet time.
 YANKEE CLIPPER Houston, this is Clipper.
 CAPCOM Intrepid, Houston. You ready to copy PADS?
 INTREPID Negative, Houston. But we will be in just
 a minute, we'll give you a call.
 CAPCOM Okay.

APOLLO 12 MISSION COMMENTARY, 11/20/69 CST 1217 GET 145:54 463/1

INTREPID Hey, Pete. Hey Conrad. Hey, Commander
Conrad. Pedro, where are you?
YANKEE CLIPPER Yankee Clipper Intrepid. Are you giving
us a call?
INTREPID No, we're talking to each other. Sorry
about that.
YANKEE CLIPPER Okay.
INTREPID I've got my helmet on, Dick. I can't
see you down there.
INTREPID Houston, Intrepid. We're ready to copy
those pads.
CAPCOM Roger, Intrepid. The first pad will
be a P30 LM maneuver, call it LM impact or LM final. Are you
ready?
INTREPID Ready to go.
CAPCOM Roger. NOUN 33, 149281750. NOUN 81,
minus 01812 plus 00603 minus 0015. NOUN 42 is NA. Burn
time NA. FDAI 162 358. AGS minus 01811 plus 00603 minus 00028.
The rest is NA.
INTREPID Roger, Houston, 149281750 minus 01812
plus 00603 minus 00015, NA, NA, NA, NA, 162358 minus 01811
plus 00603 minus 00028.
CAPCOM That's affirmative Al. A couple of
flight plan updates for you. Number 1 we would like for you
to bring back the sequence camera and stow it in ALFA 8 and
no bag will be required. Over.
INTREPID Understand.
CAPCOM Roger, Al. Also on panel 16 would you
pull your LM tracking light's circuit breaker. Over.
INTREPID Way a head of you on that one.
YANKEE CLIPPER Hello Houston, Clipper.
CAPCOM Go ahead, Clipper.
YANKEE CLIPPER I made those (garbled)
CAPCOM Roger, Dick, would you put your tape
recorder forward switch to FORWARD, please.
YANKEE CLIPPER It is.
CAPCOM Okay, the first one will be your separation
burn pad. Separation maneuver follows: Roll 180. Pitch
343 Yaw 000. GET of tik is 1480430. DELTA V 1 foot per
second. Burn Z-axis retrograde. Over.
YANKEE CLIPPER Roger. See separation attitude
Y zero, pitch 343, 000 in yaw, tik 1480430, DELTA V all up
foot per second, Z-axis retro.
CAPCOM Roger. This is your jettison pad.
Your roll angle is 220 pitch 358, yaw 352 correction, 342.
GET of jettison is 1475930. Over.
YANKEE CLIPPER Jettison altitude roll pitch 20,
pitch 258, yaw 342. GET time 1475930.
CAPCOM Roger, Dick and the last one is your

APOLLO 12 MISSION COMMENTARY, 11/10/69, cst 1217, GET 145:54 463/2

CAPCOM CSM P76 pad. GET of Fig is 1492854.5
DELTA VX minus 01811, DELTA VY plus 00603, DELTA VZ plus
00036.

YANKEE CLIPPER Roger. Copy 149354.5 X minus 01811,
Y plus 00603, Z plus 00036.

CAPCOM That's affirmative, Dick.

YANKEE CLIPPER And what was that anyway?

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 1460400, CST 1227 464/1

CLIPPER Now that I've got it, what do I do with it?
CAPCOM If you want to track the LM, Dick, this is
the data that you need for tracking.
CLIPPER First my 276 PAD, okay?
CLIPPER Thank you Jerry, I understand.
CAPCOM Roger, Dick.
CAPCOM Intrepid, Houston.
INTREPID Go ahead, Houston.
CAPCOM Roger, Al. When you get a moment here, before
you go LOS, we've got a couple of items; number 1, we'd like a few
more words if you can on what it was you saw dangling from the
CSM, I think you called it a separation package or something
like that, and also we'd like to see you go back to your primary
LOIEH canister, and give us a look at it and see if it goes off
on the CO2 again.

INTREPID Okay, we'll do that. We're a little bit suspicious
of it because we had some erratic readings for the CO2. We'll go
back to primary right now, and Houston the - it looks like some of
the stuff we used to get back to the SEP plane on Gemini, it looked
like a piece of metal about 3 feet long and about an inch wide,
it was just curling up off the back there right at the SEP plane.

CAPCOM Roger, Pete.
CAPCOM Clipper, Houston. I've got a REV 33 map update
for you.

CLIPPER Hey Jerry, can we skip that; we're kind of busy
right now.

CAPCOM Sure can, Dick.
CLIPPER Just a moment we'll be coming around the corner.
We'll be looking for you.

CAPCOM Okay, that takes care of the paper work for this
pass.

CLIPPER Thanks, pal.

PAO This is Apollo Control, Houston. It is
now 146 hours 7 minutes now into the flight of Apollo 12.
There were a series of PADS passed up to both Yankee Clipper
and Intrepid. The GET - among those the GET for the ascent
stage deorbit burn was passed along, which gave a time of
ignition at 149 hours 28 minutes 17 seconds, and we'll standby
and continue to monitor.

INTEPID Dick, take a look in the tunnel.

CAPCOM Yankee Clipper, Houston.

CLIPPER Go ahead.

CAPCOM Roger, Dick. When you get a second, I've
got some data for you, and a couple of switches for you to
check.

CLIPPER Okay, will I need the LM data?

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 146:04:00, CST 1227,464/2

CAPCOM Yes, it looks like a couple of registers
need changing.

YANKEE CLIPPER Go ahead with it.

CAPCOM Roger. R1 should be 61 10 1. R2 is 01 11 1.
Check your AC roll AUTO select valve switches to the OFF position.
And up TLN the block. Over.

YANKEE CLIPPER Okay. Okay, Jerry. I'll get that after
a bit, but I'm still trying to get this stuff over here to
the CSM.

CAPCOM Okay, Dick.

YANKEE CLIPPER Hey, Pete. I've maneuvered to the jettisoned
attitude. Don't let it worry you.

INTREPID Still worried (garbled).

INTREPID (garbled)

PAO This is Apollo Control, Houston at 146 hours
19 minutes now into the flight. We're less than 7 minutes
away now from a loss of signal with Apollo 12. We'll stand
by and continue to monitor.

INTREPID Yes, Pete. I think so.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69, CST 12:43, GET 146:20:00 465/1

CAPCOM Yankee Clipper and Intrepid, this is Houston. We're 1 minute from LOS. We're looking for AOS at 147:12. Over.

INTREPID Intrepid, roger.

PAO This is Apollo Control, Houston at 146 hours, 27 minutes now into the flight of Apollo 12. We've had loss of signal with Apollo 12 now passing above the far side of the moon. We'll recap at this time a couple of the maneuvers that were performed in the process of bringing Intrepid and Yankee Clipper back together again. To recap the constant delta height maneuver was performed at 144 hours, no minutes and 1.5 seconds with a DELTA-V of 13.8 feet per second. It placed Intrepid into an orbit with an apolune of 60.2 nautical miles and a perilune of 52.6 nautical miles. At 144 hours, 36 minutes, 29 seconds, the terminal phase initiate maneuver was performed with a DELTA-V of 28.5 feet per second giving an orbit of 73.6 by 58.6 nautical miles. We're presently looking at a LM deorbit burn which will return the ascent stage of Intrepid back to the lunar surface at 149 hours, 55 minutes, 51 seconds. For this return trip to the moon for Intrepid we'll see a velocity of 55.08 feet per second. The coordinates for impact are currently logged at 3.3378 degrees south and 23.4109 degrees west. We reacquire Apollo 12 at 147 hours, 12 minutes, and at that time we would expect to find commander Pete Conrad and lunar module pilot Allan Bean completeing their transfer back to the command module. We're at 146 hours, 29 minutes into the flight, and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 GET 14703 CST 1325 466/1

PAO This is Apollo Control, Houston, at 147 hours, 3 minutes now into the flight of Apollo 12. Apollo 12 continuing on its pass above the back side of the moon. Meanwhile in Mission Control Center, Houston, Flight Director Glynn Lunney has come in somewhat early to replace Flight Director Pete Frank. Most of the Flight Controllers on the Pete Frank Orange Shift are still at Mission Control; however, the change of shift briefing will be held at 2:30 as previously scheduled and will feature Flight Director Pete Frank and Capsule Communicator Jerry Carr. We have a correction to make to an earlier ground elapsed time which we passed along for the ascent stage deorbit. We identified a GET of 149 hours, 55 minutes, 51 seconds as the time of ignition. It is, in fact, the forecast time for impact on the lunar surface. We have 147 hours, 04 minutes into the flight and this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 147 hours, 12 minutes now into the mission. We're less than a minute away now from reacquiring Apollo 12, and when we pick up the spacecraft we expect that Pete Conrad and Al Bean will be in the final phases of making good their transfer back to Yankee Clipper. We'll stand by and monitor at this time. This is Apollo Control, Houston. We're now receiving data. This is Apollo Control, Houston at 147 hours and 15 minutes. We've not yet attempted to contact the Apollo 12 crew assuming that they are quite busy now in the final phases of their transfer.

CAPCOM Intrepid, Houston. How do you read?

INTREPID Read you loud and clear.

CAPCOM Roger, and Yankee Clipper, how do you read?

CLIPPER Houston, loud and clear.

CAPCOM Roger, read you both the same.

CAPCOM Yankee Clipper, Houston. Pete, are you in the Clipper now?

CLIPPER Pete's reading the checklist to Al.

Hey, Jerry, I got a question.

CAPCOM Go.

CLIPPER Pete wants to know if he can leave his LCG in the LM.

CAPCOM Okay, Dick. Stand by, we'll get an answer on that. I got a couple of questions for them. Would you relay them?

CLIPPER Yeah, I can, Jerry. They're both doing checklists, so we can get out of it.

CAPCOM Okay, here's our questions. You know that hanging metal they were talking about on the service module - we are wondering if that's in a position such that it might possibly be the cause of our S-band antenna problem - causing it to dither.

CLIPPER Further up than that. It is right around (garble) in the service module and it is right on the top of Dick Gordon wears his S-band antennas on his bottom left. If you go around into the upper windows.

CAPCOM Okay. We copy that and the other one is - don't forget to bring the LM TV camera across.

CLIPPER We have already got it and it is stowed in the command module and we put it in one of those special bags because it had a lot of dust on it.

CAPCOM Roger. Good.

CLIPPER And also, Houston, we need to know if we can just go ahead and leave our LCG's here or do you want them brought back.

CAPCOM We are checking on that now, Pete.

APOLLO 12 MISSION COMMENTARY, 11/20/69 13:34 CST GET 147:12:00 467/2

PAO The LCG referenced there is the liquid cooled garment. We are at 147 hours, 20 minutes now in the flight.

CAPCOM Clipper, Houston.

CLIPPER Go ahead, Houston.

CAPCOM Roger. High gain antenna is not doing too well. We would like you to go MANUAL and your angles are PITCH - minus 41, YAW - 4. Over.

CAPCOM Intrepid, Houston.

INTREPID Go ahead, Houston.

CAPCOM Roger. On your LCG question, the only problem that we have right now is in the area of contamination. We are giving a quick checkout now on that and we will have an answer for you in a couple of minutes.

INTREPID Say again, Houston.

CAPCOM Intrepid, Houston. The only problem that - the question mark we have on the LCG being left in the LM is the contamination thing. We are getting an ok on it and we will get back with you in a couple of minutes.

INTREPID Understand.

CAPCOM Your P30 looked good, Al.

CAPCOM Clipper, Houston. I have a CSM DAP load for you and a map update for REV 34.

YANKEE CLIPPER Go ahead, Jerry.

CAPCOM Okay, Dick. Your CSM -

END OF TAPE

SC Go ahead, Jerry.
CAPCOM Okay, Dick. Your CSM weight is 35 634. I've got your Trim angles any time you need them. Your map update is REV 34, LOS is 148 24 47 148 2 correction 49 43 149 11 01.
YANKEE CLIPPER Roger, I copy that and the CSM weight is 35 634.
CAPCOM Affirmative, Dick.
CAPCOM Intrepid, Houston.
INTREPID Go ahead, Houston.
CAPCOM Roger. You can leave those LCG's in the LM if you want to and let us know where you stowed them, would you.
INTREPID Will do.
INTREPID We're going to leave them in the CSM ditty bag which will be on the floor.
CAPCOM Okay, fine.
PAO This is Apollo Control Houston. We're still looking for LM jettison time of 147:54:30, a bit more than 20 minutes from this time. We're now at 147 hours 29 minutes into the flight.
CAPCOM Intrepid, Houston.
INTREPID Hello.
CAPCOM Roger. Have you got your master alarm circuit breaker closed?
INTREPID It's open.
CAPCOM Okay, Dick.
INTREPID What would you like, Houston?
CAPCOM No, that's fine the way it is.
INTREPID Is it okay? Okay.
PAO Flight director Glynn Lunney just quickly advised his flight control team we've completed all of the work in the lunar module as far as we know and we're standing by at this time for the crew to secure the hatch. We're at 147 hours and 35 minutes into the flight of Apollo 12.
PAO This is Apollo Control Houston while we're standing by, why don't we quickly go over some of our upcoming ground elapsed times for events. Looking at ground elapsed time for the jettison of the lunar module of 147 hours 59 minutes 30 seconds. A ground elapsed time for command and service module separation maneuver of 148 hours 4 minutes 30 seconds and a G.E.T. for ignition of the -
YANKEE CLIPPER Houston?
CAPCOM Roger, Clipper, go.
YANKEE CLIPPER Are you going to send something to the LM to see if the uplink is okay? How about a REV 44.
CAPCOM Standby just a second, Dick.
PAO We're looking at a G.E.T. for the ignition the deorbit burn of 149 hours 28 minutes and 14 seconds.

APOLLO 12 MISSION COMMENTARY 11/20/69 CST 13:46 GET 147:24 468/2

PAO With a G.E.T. for impact of 149 hours 59 minutes and 51 seconds.
CAPCOM Clipper, Houston. We're going to send an air reset.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 14738, CST 1400 469/1

CAPCOM Yankee Clipper, this is Houston.
Intrepid is GO. You can clear it out any time.
CLIPPER Roger. We've been trying to.
CLIPPER Houston, Clipper, how about a PYRO arm. Here comes the logic on for you.
CAPCOM Roger, Clipper.
CAPCOM Yankee Clipper, Houston. GO for PYRO arm.

CLIPPER Roger. GO for PYRO arm.
PAO This is Apollo Control, Houston, at 147 hours and 43 minutes. We presently show Apollo 12 with an apolune of 62.6 nautical miles, perilune of 57 nautical miles.

PAO This is Apollo Control, Houston, at 147 hours, 50 minutes now into the flight of Apollo 12. We've not yet received verbal confirmation from Commander Pete Conrad and Al Bean that they are both now back in Yankee Clipper, but we feel reasonably assured that they have effected their return. We are standing by at 147 hours, 51 minutes into the flight.

PAO This is Apollo Control, Houston, at 147 hours 53 minutes into the flight. Our two clocks in Mission Control, the bottom clock identified as ET is counting down to jettison. We're at 5 minutes 45 seconds away. The top clock counting down to command and service module separation, the separation by Yankee Clipper. We are now 10 minutes and 30 seconds away from that event.

END OF TAPE

YANKEE CLIPPER Houston, Clipper. 2 minutes to jettison.

CAPCOM Roger, Clipper.

PAO That was Dick Gordon reporting from the Yankee Clipper that they're now less than 2 minutes from jettison of Intrepid. All 3 crew members now back in the Yankee Clipper.

PAO About 20 seconds away from jettison now.

PAO Guidance and Control Officer reports that the two spacecrafts have separated. We've received no acknowledgment yet from the crew but on ground base displays we did readout the jettison of the Lunar Module.

CAPCOM Yankee Clipper, Houston. Go to REACQ on the high gain. Over.

YANKEE CLIPPER Roger.

PAO We have a report that the Command Service Module has now completed the separation maneuver at 5.5 second burn of the reaction control system engines.

CAPCOM Yankee Clipper, Houston.

YANKEE CLIPPER Go.

CAPCOM Roger. Your high gains beginning to jitter again. Better go MANUAL and your angles in the flight plan are good. That's minus 36 on the pitch and 352 on the yaw.

PAO This is Apollo Control at 148 hours 10 minutes. LMs systems engineers report all systems on Intrepid looks good after the jettison and subsequent CSM separation. The times we have for those two maneuvers are as follows: 147 hours 59 minutes 30 seconds for the jettison of the Lunar Module, and 148 hours 4 minutes, 30 seconds for the separation maneuver performed by the CSM. We show 13 minutes 50 seconds now until Loss of Signal from Yankee Clipper. Our Flight Director on this shift is Glynn Lunney and the Capsule Communicator coming on is Astronaut Don Lind. There will be a Change of Shift Briefing shortly in the News Center, Houston News Center. The participants are leaving at this time.

CAPCOM Apollo 12, Houston.

SC Hello.

CAPCOM Pete, the surgeon has some words for you about your sensors, sensor irritation, if you want - -

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/20/69,GET 148:13:00,CST 1433,471/1

CAPCOM Pete, the surgeon has some words for you about your sensors - sensor irritation, if you want to listen to that.

SC Why don't you stand by until they get some coffee.

CAPCOM Roger.

PAO This is Apollo Control at 148 hours 15 minutes. Out Flight Dynamics Officer has just reported that the LM jettison produced negligible effect on the lunar module trajectory, and should have no effect on the time of ignition or the DELTA V required for the LM deorbit scheduled to occur on the next revolution. That maneuver is now planned to occur at 149 hours 28 minutes 14 seconds with a DELTA V retrograde 191.3 per second. That will be a reaction control system maneuver. Total duration of 1 minute 21.4 seconds.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston. OMNI BRAVO, please.

CAPCOM Apollo 12, Houston. End of line. OMNI BRAVO, please.

PAO We're continuing to have signal strength variation through the spacecraft high gain antenna. Cap Com, Don Lind requesting that the crew switch to one of their OMNI antennas. Our ground station, at the present time is Madrid, where we have an 85 foot DISH, and we should be able to get fairly good communications through the OMNI antenna without ground receiving antenna.

SC Hello, Houston, 12. Go ahead.

CAPCOM Roger. We recommend that you shut off the high gain. First put the track switch on MANUAL, next put the high gain power switch to OFF, and (garbled) on OMNI and (garbled) OMNI BRAVO (garbled).

SC Your assumption is correct.

PAO Flight Director, Glynn Lunney now taking a status from all of his flight controllers. Now 3 minutes before loss of signal on the command and service module. The report all around the room is that we look good.

CAPCOM Apollo 12, Houston. Everything looks in good shape down here. Also the LM looks in good status for the DLD burn.

CAPCOM Apollo 12, Houston. You've still got 45 seconds until LOS. You'll be coming around the corner at 149:11.

SC Roger, now and thank you.

PAO This is Apollo Control. We've had loss of signal now. We'll reacquire the spacecraft on its 34 revolution at 149 hours 11 minutes or about 46 minutes from now. At this time, we'll switch to the Houston News Center for the Change of Shift Press Conference which is scheduled to begin at this time.

END OF TAPE

PAO This is Apollo Control at 149 hours, 10 minutes. We are now about 1 minute from reacquiring the spacecraft on its 34th revolution of the moon. During this REV the major activity will be the LM deorbit maneuver. That's to be performed at 149 hours, 28 minutes, 14 seconds causing the LM to - LM ascent stage - to impact the lunar surface at 149 hours, 55 minutes, 53.2 seconds. The maneuver, which deorbits the LM will be performed with the lunar module reaction control system thrusters. The burn time - burn duration will be 1 minute, 21.4 seconds producing a retrograde delta V of 191.3 feet per second. The maneuver will be performed at 14.22 degrees south latitude and 62.5 east longitude, which will be just about over the Sea of Fertility. The impact point is predicted to be about 4.8 miles south of the lunar module decent stage. The impact coordinances are 3.31 degrees south and 23.43 degrees west. The predicted velocity of impact is 5508 feet per second and we predict that we will have.

CAPCOM Apollo 12. Houston.

PAO We have acquisition of signal now and CAPCOM Don Lind has put in a call to the crew.

PAO Picking up we expect the propellant remaining in the lunar module descent stage to be about 350 pounds at impact and the propellant remaining in terms of Delta V will be about 394 feet per second. Our communications engineer has just reported that we are having a bit of a problem locking up on the command module at this time and we will continue to stand by.

PAO And we have a good solid lockup now. The control systems engineer reports that the LM looks good at this time. We now show 12 minutes, 53 seconds, till ignition for this lunar module ascent stage deorbit. One of the primary purposes for the maneuver is to give us a calibrated signal on a given level of energy is transmitted through the lunar surface to the passive seismic experiment. We had indications from the previous seismic experiment left on the moon as to what sort of signals we get from the instrument. We don't, however, have a good handle on how a given level of energy is transmitted the lunar surface. It is hoped by impacting the LM ascent stage, which has a known mass and a known velocity, it will help us in interpreting previous and subsequent seismic signals from the passive seismometer.

APOLLO 12 MISSION COMMENTARY, 11/20/69, 15:31 CST GET 149:10:00 472/2

CAPCOM Apollo 12. Houston.

PAO Network controller reports that we still do not have good two-way lock with the command module and we will be trying to transmit in the blind to Dick Gordon.

CAPCOM Apollo 12. Houston. In the blind. For your information, for P20 tracking of the lunar module with the sextant, you will get a program alarm 20430 when the LM vector intersects the surface. With a VERB 66 enter and reset the alarm, you will clear that. Impact time at the surface should be 149 plus 55 plus 59. That is when you should get the alarm. 20430 and it's only the LM vector passing through the surface.

PAO CAPCOM Don Lind just passed up a new impact time for the LM ascent stage, updated about 5.8 seconds from the previous time we had. The current prediction for impact is 149 hours, 55 minutes, 59 seconds. The altitude of the lunar module ascent stage at the beginning of the deorbit burn will be about 57.8 nautical miles. The predicted flight path angle at impact will be about 3.68 degrees. WE also have a predicted crater size for the LM impact. The prediction for that crater is it will be elongate about 6 meters wide and about 12 meters long with a depth of about 4/10's of a meter to 6/10's of a meter and at this time we still do not have good two-way lock with the command module. We are getting good data from the LM.

END OF TAPE

CLIPPER Hello, Houston, Yankee Clipper.
CAPCOM Loud and clear. How are you doing,
Dick?
CAPCOM Apollo 12, Houston.
CAPCOM Doing pretty good. I've got the
LM in (garble). (rarble) watching the LM. What time is
that burn scheduled for?
CAPCOM Okay. The burn ignition time is
149 plus 28 plus 14. Did you get a transmission from us
in the blind about two minutes ago about a program alarm?
CLIPPER Negative.
CAPCOM Roger. If you're going to track
in P-20 which we see you are setting up for, when the LM
vector intersects the lunar surface, you will get a program
alarm 20430. When you go VERB 66 and enter and put your
vector in that slot deal and reset, the alarm should go
away. Now the impact time is expected to be 149 plus 55
plus 59.
CLIPPER Okay. Thank you.
CAPCOM Now, Roger, we've got some other
goodies for you. We've got a P-40 maneuvering pad, when you
are ready to copy. We've got some words from Pete about his
skin irritation, we've got consumables pass and a few other
things when you want them.
CLIPPER (Garble)
CAPCOM Apollo 12, we're not reading you well
on that last transmission. Could you give that again?
CLIPPER Give what again?
CAPCOM Your last transmission. You were
breaking up.
CLIPPER I said you'd better hold all that
stuff awhile. Now they are trying to pack the spacecraft
with all the stuff they brought back from the LM and I'll
have to check the LM itself. We won't have time for anything
else right now.
CAPCOM Very good. We'll hold it.
PAO We're coming up now on 2minutes, 20
seconds until ignition of the LM ascent stage. That ignition
signal will be transmitted via radio signal from Mission
Control. The scheduled landing impact time is now 29 minutes,
44 seconds away.
PAO Coming up now on 1 minute to ignition.
Our LM guidance engineer says we are clearing out to command
the LM.
GUIDANCE Houston, 1 minute to LM ignition.
CLIPPER Roger.

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 14921, CST 1542 473/2

PAO Coming up now on 20 seconds to ignition.
10 seconds, 9, 8, 7, 6, 5, 4, 3, 2, 1, and we have retrofire.
Guidance confirms we are burning all four jets.

CAPCOM Apollo 12, Houston, the LM is on its
way down.

CLIPPER Roger. (Garble).

PAO Thirty seconds into the burn. Guidance
reports accelerations look good, up to 36 feet per second,
total DELTA V to be gained 191.2 feet per second.

CLIPPER Houston, 12.

CAPCOM GO, 12.

CLIPPER The LM still burning?

CAPCOM That's affirmative.

CLIPPER Okay.

PAO Coming up on cutoff and we've had
cutoff right on time. Total burn duration 121 or 1 minute,
1.4 seconds.

END OF TAPE

PAO Our flight dynamics engineer estimates, based on preliminary tracking, that we're going to be about 20 miles short the predicted or planned impact point had been about 5 miles, 4.8 miles south of the lunar module descent stage. The prediction now is that it will be about 20 miles short. We're standing by for the flight dynamics officer to come up with a predicted set of coordinates for impact.

SC All right, Houston, this is 12. Let me know (garbled)

SC Houston, Apollo 12.

CAPCOM All right Houston, go ahead.

SC Roger. Will you let me know when he's doing the burn, please?

CAPCOM Say again 12.

SC Will you call and let me know when the LM finishes it's burn.

CAPCOM Okay, it has finished it's burn now. It's been over about a minute and a half.

SC Thank you.

CAPCOM Apollo 12, Houston. We show just under 20 minutes until LM impact.

PAO We're now 19 minutes from predicted impact. The predicted weight of the LM ascent stage at impact is 5254 pounds.

CAPCOM Apollo 12, Houston. We've computed a new impact time for the LM impact to the surface at 149 plus 55 plus 17.

SC Roger.

PAO We're now a little less than 15 minutes from the scheduled time of LM impact. The new impact time passed up to the crew by CAPCOM Don Lind was 149 hours 55 minutes 17 seconds. We also have some new impact coordinates. The latest estimate from the flight dynamics officer is the impact will occur at 3 point 95 degrees south latitude. Twenty-one point seventeen, 21 point 17 degrees west longitude and we should have that broken out in actual miles from the LM descent stage shortly.

PAO We're now coming up on 10 minutes until the LM impact. The flight dynamic officer advises that the impact point should be about 39 miles east-southeast of the targeted point. The targeted point was about 4.8 miles south of the LM landing site.

END OF TAPE

SC Houston, Apollo 12.
CAPCOM Go ahead, 12.
SC Roger Don. Let's get caught up on some of those pads. Let me know when that thing impacts so I can shut off this camera because I can't see them through the telescope?
CAPCOM Roger. We've got 6 minutes to impact and I've got a P40 TEI pad for you.
SC Okay. Go with the TEI pad.
CAPCOM Roger. TEI 39 SPS G&N NOUN 47 35629 NOUN 48 is minus 067 plus 044 GET 160421926. NOUN 81 plus 34636 plus 06711 minus 01282. Roll NA Pitch 109 YAW NA all the rest is NA. Ullage 4 jets 11 seconds and this assumes no plane change 2.
SC Okay. Copy TEI pad 39. SPS G&N 24629 minus 067 plus 044 160421926 plus 34636 plus 06711 minus 0132 pitch is 109 4 jets 11 seconds no plane change 2.
CAPCOM That's affirmative.
CAPCOM Does Pete want to hear some recommendations from the Flight Surgeon on his skin irritation?
SC No, he doesn't need any information on that.
CAPCOM Okay. I've got a consumable pad for you, if you want it?
SC You've got some what?
SC Don, say again. You were cut out.
CAPCOM Roger. We've got a consumable update for you. RCS total is 47.6, ALPHA is 46.4, BRAVO is 48.7 Charlie is 46.4 DELTA is 48.7 and we show 2 minutes and 38 seconds to LM impact.
SC Okay. Understand. Could you tell me when I should start on the secondary propellants? On the secondary fuel.
CAPCOM Roger.
CAPCOM 12, we'll get an estimate on that for you.
PAO This is Apollo Control. We're now one minute 50 seconds from scheduled impact. One of our displays in Mission Control will be showing the seismic trace. Hopefully, we see a very clear indication of the LM impact on that trace. We would expect that to show on the 4th trace from the left which is the short period data from the passive seismic experiment. Now 1 minute, 25 seconds from LM impact.
PAO We're coming up on 30 seconds to impact. Guidance Officer reports the LM is going to attitude. Now we're getting good data from the Lunar Module at this

APOLLO 12 MISSION COMMENTARY 11/20/69 CST 1607, GET 149:46 475/2

PAO -time and of course we'd expect that -
all that data to go blank at impact.

PAO 10 seconds to impact.

CAPCOM Countdown for LM impact. 3 2 1 MARK.
LM IMPACT.

PAO And we've lost data from the LM
indicating we impacted on time.

SC Okay, thank you.

SC Houston, Apollo 12.

CAPCOM Go.

END OF TAPE

SC Houston, Apollo 12.
CAPCOM Go.
SC Would you like to take these numbers down?
CAPCOM That is affirmative.
SC It's on its way.
CAPCOM Roger.
SC And, Don, we want to report the crew status report. Everybody is feeling fine. No medication today. There's been enough excitement.
CAPCOM Very good. Copy that.
SC And those onboard readouts - the onboard readouts - those 3 batteries are still at 37.1. And the rest of our transmission is being taken care of.
CAPCOM We got 37.1. Will you give us the end of that?
SC That's all three of my batteries. Battery C PYRO B and PYRO A.
CAPCOM Roger. Understand for all batteries. Also, would you give us a word about the CO2 cartridge secondary. We were wondering why you'd gone to secondary if you had any other trouble on that? Apollo 12, that was the LM cartridge we were talking about. If you'd had another glitch on the CO2 sensor.
SC Don, since our high gain is acting up like it is, do you want us to go OMNI. OMNI BRAVO tonight.
CAPCOM That is affirmative. OMNI BRAVO. That's OMNI BRAVO when you complete your - are asleep and we'd like you to put the normal S-band voice to OFF at that time.
SC Roger.
CAPCOM One question. We were wondering if the sequence camera had been wrapped when you started for - to prevent damage. Your choice as to where you want to stow it. Apollo 12, would you hold what you have on attitude until we finish this E MOD dump?
CAPCOM Dick, for the RCS we're 25 pounds on each quad above the level at which we'd open the secondary. So, things are okay there.
SC Okay. I won't worry about it tonight.
CAPCOM Roger. Apollo 12, for your information, all the surplus experiments for ALSEP are in great shape. They're all operating very well. There is apparently no temperature degradation at all because of any dust. So, that looks like that came out real fine. The passive seismic is working fine. It - noticed Pete walking past. Also got a very nice trace for your liftoff. On the LM impact we were probably about 40 nautical miles away. So, the short period didn't get anything, but it looks like the long period got a couple of signals. Also the cold cathode gauge could see the sublimator walking past, Pete, when you went over to check the side experiment and all the other

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 149:56:00, CST 1617,476/2

CAPCOM - experiments are working fine. So, everybody is absolutely delighted in the way you deployed the ALSEP. The passive did record the impact on long period.

CAPCOM Apollo 12, Houston. Before you close out the LEB, we'd like to just remind you to zero the optics and we'd like you to leave the power on so that we can watch the CDU's tonight. We've seen just a couple of glitches. We just want to follow through on that and see how they're doing.

SC They're doing fine.

CAPCOM Very good.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 16:17 CST GET 150:06:00 477/1

CAPCOM Apollo 12. Apollo 12. If you read would you give us OMNI BRAVO. OMNI BRAVO.

PAO This is Apollo Control. We are now 10 minutes from loss of signal with Apollo 12. The spacecraft is currently in an orbit with a high point of 62.4 nautical miles and a low point of 57.2. Current altitude 61.3. A science briefing is scheduled to begin about 4:45 PM, central standard time, in the News Center briefing room. The briefing will be conducted by the Principal Investigators.

CAPCOM Apollo 12. If you read, give us OMNI BRAVO. OMNI BRAVO.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/20/69 CST 1637, GET 150:16 478/1

CAPCOM Apollo 12, Apollo 12 OMNI BRAVO.
OMNI BRAVO.

CAPCOM Apollo 12, Houston. Apollo 12,
Houston. Could you give us OMNI BRAVO? OMNI BRAVO.

CAPCOM Apollo 12 Houston. We show about
3 minutes to LOS, if you could give us OMNI BRAVO we would
appreciate it. OMNI BRAVO.

CAPCOM Apollo 12, Apollo 12 Houston. We
show 2 minutes from LOS. We would like OMNI BRAVO, if you
could. OMNI BRAVO.

CAPCOM Apollo 12, Houston. We show 1 minute
from LOS. If you read us, would you give us a OMNI BRAVO.
OMNI BRAVO.

PAO This is Apollo Control. The spacecraft
is now gone behind the Moon. We will be reacquiring in about
45 minutes. The Apollo 12 Science Briefing is scheduled to
begin shortly in the News Center auditorium in the small
briefing room in building 1. The briefing will be conducted
by principal investigators, Apollo 12 principal investigators.
At 150 hours, 24 minutes this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control at 151 hours 23 minutes. We passed the point of acquisition about 13 minutes ago. We have not established communications with the spacecraft on this revolution. The crew is scheduled to be sleeping at this time. Cap Com, Don Lind has been putting in periodic calls to the crew. We do not believe that they are asleep at the present time, and we're in the process now of attempting to reestablish a usable OMNI antenna, and its signal long with the spacecraft. The Flight Dynamics Officer has recomputed the landing point of the LM ascent stage. The recomputed impact point differs very little from the previous estimate. The latest estimate of the landing point is 3.95 degrees south, 21.17 degrees west. This would be about 36 nautical miles east of the planned impact point, and about 14 nautical miles south for a total of about 39 nautical miles east, southeast of the planned impact point.

PAO This is Apollo Control. We, as you heard, have not had any success making contact with the crew and getting the proper OMNI antenna selected, so that we can reestablish communications. The next step will be to send a radio signal to the spacecraft which will trigger the master alarm in the cabin giving the audio tone also to the headsets. The rationale in reaching this decision at this time was to, if necessary, to awake them as early in the sleep period as possible, to reestablish com rather than continuing to try to get through to them and get the proper OMNI antenna selected and perhaps interrupt their sleep, after they're more soundly asleep later.

PAO This is Apollo Control at 151 hours 32 minutes. We are sending the radio signal at this time which would trigger the flashing alarm light on the display console and also send a tone to the headsets. The best guess that we have at this point is that the crew was, after a long day quite tired as they went behind the Moon. Perhaps beginning the sleep period on the backside of the Moon. We want to of course, reestablish communications and do that as early in the sleep period as possible so that decision was made to attempt to arouse them at this time. Get communications reestablished on the OMNI antennas, and then allow them to go back to sleep.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 15133, CST 1755 480/1

PAO This is Apollo Control at 151 hours, 35 minutes. The network controller just reported we started Madrid.

PAO Our network controller reports we are now getting a weak signal from the spacecraft through the 210 foot dish at Goldstone, California. Still no solid lock on.

CAPCOM Apollo 12, Houston, Apollo 12, Houston. Could you give us OMNI BRAVO, turn up your S-band for us?

CAPCOM Apollo 12, Houston, do you read us?

CAPCOM Apollo 12, Houston, do you read?

CAPCOM Apollo 12, Apollo 12, this is Houston, do you read?

CAPCOM Apollo 12, Apollo 12, in the blind, give us OMNI BRAVO, please.

PAO This is Apollo Control at 151 hours, 43 minutes and we are going to hand over now to the Goldstone site where we have a 210 foot dish antenna for reception and Capcom, Don Lind, will continue to try to make contact with the crew and to reestablish the proper OMNI antenna for communications lock on.

END OF TAPE

PAO This is Apollo Control at 151 hours 54 minutes. We're continuing at this time to attempt to reestablish communications with the spacecraft and presumably to awaken the crew. The last look we had, at the CSM prior to LOS on the previous revolution, everything looked good. The crew was, we expect, quite busy at that time. We should be on OMNI B at the present time, we suspect that the spacecraft is configured for OMNI D, which is not oriented in the proper direction for us to get sufficient signal both uplink and downlink for a lockon. The 210 foot DISH at Goldstone, California is receiving the signal from the spacecraft. However, it is not a sufficient signal strength to allow us to establish lock. We have about 27 minutes now before the spacecraft again goes behind the Moon and we will continue through radio signals which would activate the flashing light and tone in the headset and also by calls from the Cap Com to reestablish communication. There is no concern in Mission Control at the present time. However, the situation, principal concern is to awaken the crew, if that is what is necessary as early in the sleep period as possible to avoid disturbing their sleep any more than necessary. At 151 hours 56 minutes, this is Apollo Control continuing to standby.

CAPCOM Apollo 12, this is Houston. Do you read us?

PAO Our Network Controller reports that we have acquisition of signal.

CAPCOM Apollo 12, Houston.

PAO And we have data.

CAPCOM Apollo 12, this is Houston. Do you read us?

PAO Our guidance and control officer reports the spacecraft is in the proper attitude for the sleep configuration. At a stable attitude and we are continuing to try to get some reaction out of the crew.

SC Hello, Houston. Hello, Houston. Apollo 12.

CAPCOM Hello, Apollo 12.

SC What do you want?

CAPCOM We were just a little concerned about how you letting you go for 8 hours without any com. We're sorry to interrupt your sleep, but now we've got you back in com, so we're just going to wish you good night. Sorry for the interruption.

SC Okay. We're not sleeping. We're just all trying to get clean in here. So, we had the com off. We'll be back with you after awhile though. Don't panic.

CAPCOM Roger. No problem. It's just that we had no TM or anything. We didn't want you to go to sleep before we got a hold of you.

PAO This Apollo Control. You heard Pete Conrad advise that the crew had not gone to sleep. They were busy getting the spacecraft cleaned up. We presume getting things

PAO - stowed away and getting ready for their sleep period and had the communications circuit off. We now have good solid lock on. Continuing to get data, and we expect that the crew will be beginning their sleep period shortly.

PAO. This is Apollo Control at 152 hours 12 minutes. Our communications engineer has just reported that the crew has begun configuring their communications for the sleep period, and we expect that they will be getting to sleep before too much longer. The flight plan called for the sleep period to begin at 150 hours. About 2 hours ago, Pete Conrad reported that they were getting things cleaned up. Apparently the crew was a bit dirty after their extra vehicular activities and getting the spacecraft - their equipment cleaned and stowed. We had reacquired or had the spacecraft come around in front of the Moon in position for a reacquisition at 151 hours 9 minutes. At that time, the spacecraft communications system was apparently configured so that the OMNI antenna - the active OMNI antenna was not pointed in the proper direction for us to receive or to transmit to them. The original thinking was that the crew had probably configured for sleep on the back side of the Moon, and come around in front with the - improper OMNI antenna. At 151 hours 29 minutes, after several attempts to establish communications via the capsule communicator, Flight Director, Glynn Lunney, gave the order to transmit a signal to the spacecraft which would activate the alarm system on their display panel, flashing a light and feeding a tone into the headset. Apparently the weak signal strength which we had both down from the spacecraft and up to it, did not allow us to get that alarm in, and we apparently never triggered the alarm. At 152 hours 2 minutes, we again established a lock on through the OMNI antennas with the 210 foot antenna at Goldstone, California, and about one minute later, Pete Conrad responded with a hello and wondered what we were calling about. In reconstructing the situation, apparently the crew had the communications configured on in the spacecraft. We were not able to get to them to get the proper OMNI for data, and had neither data nor voice communications. At this time, we are getting good data a high bit rate data through the OMNI's and the high gain - the large 210 foot antenna at Goldstone, and it appears that the crew is at this time getting prepared for their sleep period.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69 18:37 CST, GET 152:15:00 482/1

PAO And the large 210-foot antenna at Goldstone and it appears that the crew is, at this time, getting prepared for their sleep period. We have some 7 minutes left before loss of signal again, as Apollo 12 goes behind the moon on its 35th revolution. At 152 hours, 15 minutes, this is Apollo Control, Houston.

PAO This is Apollo Control at 152 hours, 22 minutes. We have just had loss of signal now. The spacecraft at the time of LOS looked good. The crew was configuring at that time for their sleep period and we expect they will be getting to sleep on the back side of the moon. Prior to reacquisition - we will next hear from the spacecraft after next acquire, in about 45 minutes. At 152 hours, 23 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/20/69, GET 153:08:00, CST 1930, 483/1

PAO This is Apollo Control at 153 hours 8 minutes. We have just acquired the spacecraft now in its 36th revolution of the Moon. We expect the crew will be asleep at this time. We'll stand by, briefly to see if we get any calls from the spacecraft. At the present time, Apollo 12 is in an orbit with apaloon of 60.2 nautical miles and a perilune of 53.9. The combined weight of the - the CSM weight rather is 35 627 pounds.

PAO This is Apollo Control. We're getting good high bit rate telemetry data at this time from the spacecraft. The crew now in their sleep period. We don't expect any further conversation from the spacecraft until the sleep period ends at 157 hours 30 minutes. We'll be prepared to come back up should we get any calls from the crew. In the meantime, we'll be taking the circuit down and continuing to monitor. At 153 hours 19 minutes, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control 156, 8 minutes ground elapsed time. Ten minutes until loss of signal in the 37th lunar revolution. The crew is still asleep at this time, some 1 hour, 21 minutes remaining in the scheduled sleep period. Present orbit approximately 62.6 by 57.6 nautical miles apolune and perilune, respectively. At 159 hours and 4 minutes, slightly under 3 hours from now, the crew is scheduled to do a 380.5 feet per second service propulsion system maneuver out of plane to the north which will drive the orbit back over these photo sites which will be photographed later tomorrow morning. These are candidate landing sites for future Apollo missions. The Fra Mauro formation, Lalande and one other area which escapes my memory at the moment. Descartes, there you go. And at 156 hours, 9 minutes, ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control 157 hours 23 minutes ground elapsed time. We have had acquisition now for about 15 minutes on the 38 revolution. The crew still has about 5 minutes remaining in the scheduled sleep period, however it has been noticed on the ground that the high gain antenna angels have been changing in the last few minutes and we are anticipating a call from the crew, surgeon says that the 2 crewmen who have bio-medical instrumentation during the sleep period are awake at this time. So we will leave the air to air to ground circuit uplive to catch the first exchange this morning.

CAPCOM Good morning Apollo 12, Houston.

SC Go ahead Houston.

CAPCOM Morning 12, standing by.

SC Roger.

SC Okay Ed, crew status report reads across the the board PDR, CMP, (garble) 11021 04023.

CAPCOM Roger, we copy.

CAPCOM 12, Houston, we are standing by with the updates as called out in your flight plan and in that order.

SC (garble)

CAPCOM Okay and your ready to copy lunar over plane change 2.

SC Okay.

CAPCOM Manuever pad lunar over plane change 2 is PS G and M 35584 minus 078 plus 029, 159. Okay hold it there Dick. Okay, let's pick up again on the PDP, we are getting a lot of static. 159 044478 minus 00136 plus 03811 plus all zeros. Roll fix YAW all zeros. 00640 plus 00565, 03813, 019, 03682, 05, 0456, 387 four sight star is 036 up 16.5 left 1.9 and your stars Serious and Rigel, you have 223 084 071. The LOX is 4 jet 11 seconds. Standing by for read back.

CAPCOM And 12, before the read back, we are also standing by with your state vector target load and rest masks, this will give us crew and accept.

SC (garble) Houston. And here comes the read back. Lunar over plane change number 2 and SPS G and M 35584 minus 078 plus 029, 15904. 4478 minus 00136 plus 03811 all zeros. Roll fix YAW all zeros. 00640 plus 00565. 03813, 019, 03682. 05, 0456, 387. 036 up 16.5 left 1.9 Serious and Rigel 223 0484 071. 4 jet 11 seconds.

CAPCOM Reads back correct and 1 comment that's heads up.

SC Okay.

CAPCOM Consumables update at GET 157 plus 00. RCS total 47.1. 46.1 on A, 49.3, 45.4, 47.6 and assuming that you have stirred H2 total tank 1 44 tank 2 44. 0247 and 49.

SC Okay copied all this.
CAPCOM Coming at you with a map update, REV
39. LOS 158 1632. 1584150. 159 0246.
SC Roger. LOS 158 1632 1584150. 159 0246.
CAPCOM Reads back correct. Standing by with
a PEI pad, when you are ready to copy.
SC Go ahead.
CAPCOM PEI 41 STS P and M 34264 minus 078 plus
028 164 41 1604. Your delta V's plus 36554 plus 04701 plus
00329 roll NA pitch 092 YAW NA your (garble) 4 jet 11 seconds
and that assumes the lunar orbit plane change 2.
SC Okay, PEI 41 STS P and M 34264 minus 078
plus 028 164 41 1604 plus 36554 plus 04701 plus 00329 NA 092
NA 4 jet 11 seconds, assumes lunar orbit plane change 2.
CAPCOM That's correct.
CAPCOM 12, Houston, could we have the configuration
of the high gain track mode and beam west?
SC Roger, manual medium.
CAPCOM Copy.
SC Hey, we are playing with it now for you.
CAPCOM Roger.
SC Okay, we are react narrow now.
CAPCOM Roger, react.
CAPCOM 12, Houston. Would you like some
information on the crater which you made?
SC Yea.
CAPCOM Okay, the location is South 3.95 and
West 21.17 and that's relative to the Surveyor 36 nautical
miles East and 14 nautical miles South. And you will be
able to see that on your - where the actual location is on
the Southwestern edge of the circle for target of opportunity
39. Your velocity at impact was 5502 and you came in at the
angle of about 3.8 degrees relative to local horizontal.
SC Hey, give me the Lad line again.
CAPCOM Roger, that's 3.95 South 21.17 West,
and we did pick up on the PSE. We've got some long period
oscillations from it. They lasted on the order of 40 to 50
minutes.
SC Good.
CAPCOM 12, the computer is yours.
SC Thank you.
CAPCOM Pete, Houston.
SC Go ahead.
CAPCOM Okay Pete, you can dispense with the
bio-harness and we have some recommendations for you if you
feel you need it for clearing up some of the skin irritation.
SC Okay, it goes away as soon as I take
it off. The one that I have is all dried up now, that I can
move, so go ahead with your recommendation.

CAPCOM Okay, we recommend you consider the following. Wash thoroughly around all sensitive locations with the wet wipe and then remove bio-senses and (garble) Wash the skin in those areas with wet wipes and let dry. Apply the skin cream to the infected area twice daily and apply no bandages over the irritated areas. And in drying, just let it dry in the air.

SC Okay, thank you.

CAPCOM Apollo 12, Houston. Would you give us the shaft key pad reading and also if you feel any oscillations?

SC The torquing is reading 35.9 and the shaft is reading 0.4 and oscillating between 3599 and 0.5.

CAPCOM Roger and thank you. We are seeing deviations at a half of a degree down here.

SC That's about right.

CAPCOM Roger, would you take the optic couplings switch to direct and see if it stops?

SC (garble) do it.

CAPCOM Roger.

END OF TAPE.

CAPCOM 12, Houston.
SC Go ahead.
CAPCOM Say, it looks as though it would be possible for you folks to do some photography on the impact or the crater which you folks made with the ascent stage. We can give you an idea of what the procedure would involve and you can use your own discretion as to whether you want to try it.
SC What are you thinking of using to take the pictures, Ed? Also, Houston, the shaft is still oscillating a half degree here in the direct.
CAPCOM Roger. Okay, you'd be using the 250 millimeter lands and it'd be handheld out the hatch window. If you'd like I can read you up a quick summary of the procedure.
SC Let's see, the procedure's not necessary. Give me the gimbal angles and the time and what window.
CAPCOM Okay. What you do is immediately follow in the Lalande high resolution photography on REV 39 which appears to be the best place to pick this up. You stop your pitch rate and do a 20 degree roll left. Impact point will be visible out the hatch window 22 miles south of track. TCA would be 159 47 23 and we've already given you the information of where it appears on your Target of Opportunity map. You would remove the camera from window 4, change to 250 millimeter lense and hand hold out the hatch window and the following settings would apply: F5.6 and 1 125. And you can take several shots.
SC Okay, I've got after Lalande photography, stop pitch, 20 degree roll left, TCA is 159 47 23, 250 millimeter lense, F5.6 and 1125.
CAPCOM That's right. That's 1 125th.
SC Roger. And they want us out of the window number 5? Or the hatch window?
CAPCOM That's affirmative. Out the hatch window.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Okay, with reference to our questions we just had on the optics I'll tell you what we've seen down here. We've just seen the oscillation intermittently and so far we've seen no effect on the P52's and we've observed this oscillation only in the zero mode.
SC Okay.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM 12, we've observed that the high gain antenna works better after being off. Therefore, we'd like to request that you turn the high gain antenna power off at LOS and then turn it back on again at AOS.
SC Okay.
CAPCOM 12, Houston. One minute to LOS.
SC Roger, Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, 00:37 CST, 158:15:00 GET 489/1

CAPCOM 12, Houston. 1 minute to LOS.

SC Roger. Roger.

SC Roger. There are the torquing angles.

Are you picking them up?

CAPCOM That's affirmative. We have them.

SC Okay. I'm torquing at this time.

CAPCOM 12, see you on the other side.

SC Bye-bye.

PAO This is Apollo Control. Apollo 12 has

just gone around the corner on the 38th revolution. We've had loss of signal from the spacecraft. AOS in about 47 minutes. Ignition - counting down to ignition for the plane change maneuver some 47 minutes and 5 seconds until that maneuver. And at 158 hours 17 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 159 hours, 2 minutes ground elapsed time. Less than a minute away from acquisition as Apollo 12 comes out from behind the moon on the 39th revolution. At some 2 minutes, 14 seconds until ignition for the SPS plane change maneuver coming up at 159:04. As mentioned earlier this 381 foot per second out of plane maneuver will drive the spacecraft orbit back over the potential landing site for future Apollo Missions. These landing sites will be photographed with considerable detail by the crew. We should have acquisition now. We'll stand by for the first call.

SC Houston, Apollo 12. We're standing by for the burn.
 CAPCOM Apollo 12, Houston. We TM, we're looking at you.
 SC Okay. Good show.
 CAPCOM 12, Houston. You're looking good.
 SC 12, Roger.
 SC Okay, Houston. Minus 1/2 plus .2.
 SC (garble)
 SC Okay. Minus .6 plus .2 plus .7.
 CAPCOM Copy, 12.
 SC Okay. The EMS is minus 11.3.
 CAPCOM Roger. 11.3. Affirm, look good and we've got a REFSMAT when your ready.
 SC Okay. Let us get out of this one.
 SC Okay, Houston. You have P00 and ACCEPT.
 CAPCOM Roger, 12.
 SC Hello, Houston. 12.
 CAPCOM 12, Houston. Go ahead.
 SC Okay. Fuel is 29.5. Oxy 29.7.
 (garble) 60,000 increase.
 CAPCOM We copy, 12.
 SC And do you need anything else for us?
 On that burn?
 Do you need anything else?
 CAPCOM Negative 12. We've got all that we need.
 SC Okay.
 CAPCOM 12. Computer is yours. And with the information for photo Lulaundy.
 SC Okay. Go ahead.
 CAPCOM Okay. Photo Lulaundy in REF 39, T1 1594019, T2 1594419, Roll, pitch and yaw, 000.9, 256.6, 005 - scratch that - that's 000.5.
 SC Okay. I didn't get the last one there roll 000, something, 256.6 and 000.5.
 CAPCOM Okay. that's correct and roll is 000.9.
 SC Okay. And the Time is 1594019, 1594419.
 CAPCOM Correct.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 0134, GET 159:12 491/1

CAPCOM
charge on Batt A.

Apollo 12, Houston. You can start

SC

Houston, 12.

CAPCOM

12, go ahead.

SC

That hot engine of ours didn't by any
chance buy us enough gas to come home a day early, did it?

CAPCOM

We'll check on that. Stand by. We'll
see what we can work out.

SC

Yeah, I knew it was touch and go with
fuel reserves but seeing the engine was so good I didn't
know whether we'd wound up with a little bit more.

CAPCOM

Okay, 12. We're thinking on that one.
12, Houston. You can start charge on Batt A.

SC

Roger and work.

END OF TAPE

SC Hello Houston, 12.
CAPCOM 12, Houston. Go ahead.
SC Hey Ed, will you ask SAO how come I've
got 8 minutes worth of exposures on this target when T1 to
T2 is only 4 minutes long?
CAPCOM Roger, will do.
CAPCOM Dick, that's just pad on the film, you
can cut it off before or after as you see fit.
SC Okay. How about I thought maybe I had
missed something.
CAPCOM No way.
SC It is possible. Man, this SPS is a real
hummer, isn't it?
CAPCOM Yea, it is really throwing it out.
SC That's the first time I have ever seen
it wallow, it is starting to wallow through the sky now.
CAPCOM Yea, copy that Dick.
SC Say Ed, on the target of opportunity
number 39 way back on that circle is the LM ascent stage
crater?
CAPCOM Stand by, Pete it is on the Southern
and I will give you - it is a little bit one way or the
other. Stand by.
CAPCOM Pete, that's on the South edge, directly
on the South edge of the circle.
SC Okay, it indicates on the map there,
that theres a sort of a ridge running along there. Is it
on the East side of the ridge or on the left side of the
ridge?
CAPCOM Stand by.
SC It's not a ridge, I guess it's a
mountain I'm looking at down there, Ed. On this map it's
not too steepy.
CAPCOM Okay Pete, the ridge, which I believe
you are talking about, runs along to the Western side of
the center of that circle, so that the impact ought to be
a little bit to the East of that ridge. I agree the map is
not too well defined in that area.
SC Okay, very good. Thank you.
CAPCOM Al, would you verify that you've started
that battery charge or that it is in work?

END OF TAPE.

APOLLO 12 MISSION COMMENTARY 11/21/69 CST 01:54 GET 159:32 493/1

CAPCOM Al, would you verify that you've started that
battery charge or that it is in work?
SC It's in work. We're kind of busy right now.
CAPCOM Okay, thank you.
SC All right, Houston. Bat A charge started.
CAPCOM Roger, Pete. Thank you.

END OF TAPE

SC Hello, Houston.
CAPCOM 12, Houston. Go ahead.
SC Okay. Can you pick up the DSKY?
CAPCOM Roger. We have it.
SC There you are. That's not bad for a
gyro torquing, huh?
CAPCOM Roger, Dick. Looks real good.
SC I thought maybe we ought to be using I
thought maybe we ought to be using it more often.
SC Houston, I'm going to go ahead and torque
at this time.
CAPCOM Okay. We're standing by.
SC You got it.
CAPCOM 12, Houston with a stereo photo and map
update REV 40.
SC Okay. Stand by a second.
SC Go ahead.
CAPCOM Stereo photo, T1, 160:58:54; T2, 161:55:58,
map update, REV 40, LOS 160:15:24, 160:40:11, 161:01:15.
SC Roger, Houston. Stereo photo, 160:58:54,
161:55:58; map update, REV 40, 160:15:24, 160:40:11, 161:01:15.
CAPCOM Readback correct. And we have some update
for the time for shutter speed changes, there over on 3-140.
The ship - -

END OF TAPE

CAPCOM That's 140 with a shift of 5 minutes.
Just take 5 minutes and add it to each and that'll give
you for 4 of them in the order in which they are on the
page. 16111, 16121, 16139, 16143.

SC Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC We've been having a lot of discussion
here and we concluded that we goofed on Lalande and we got
you some neat 500 millimeter pictures of Herschel.
Now I've got a question for you.

CAPCOM Okay. Go ahead.

SC Would you rather we took the 500
millimeters of Lalande on this next pass rather than the
Stereo Strip or go on and get the thing in order and we
feel that the rev. (garble) at TEI and we could pick either
the Stereo Strip which would be a little off set looks like
along the same diameter as Lalande off to the left or we
could pick up the 500 millimeter (garble), either way.

CAPCOM Okay, Pete. Stand by on that.

CAPCOM 12, Houston.

SC Go ahead, Houston.

CAPCOM Okay. Lalande is the lowest of photo
priorities, so we recommend that you continue with the
flight plan the way it is and if it looks to be possible
to pick that one up on the last REV before TEI, then we
can go ahead and give it a go. But don't disturb the flight
plan now.

SC Okay. We'll give it a go before we
begin with the last REV and ya'll will work up the T1, T2
times for us. And we will get it right this time. Sorry.

CAPCOM Okay. Pete, no problem. We'll work
those up for you and did u copy the transmission on the
changes on the (garble) shutter speed on page 3-140 -

SC No, we were (garble). No we sure
didn't so how about running that by again?

CAPCOM Okay. On page 3-140 of your flight
plan we have the DAK shutter speed changes. There's 4 of
them and you add 5 minutes to each one of those. And that'll
give you 16111, 16121, 16139, 16143.

SC Okay. Got that done.

CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 0234, GET 160:12 496/1

CAPCOM 12, Houston. One and one-half minutes to LOS and a reminder on the power on the high gain. And also, were you able to pick up anything on the target of opportunity.

SC No, we weren't.

CAPCOM Roger.

SC And the high gain power is off.

CAPCOM Thirty seconds, 12. We'll see you on the other side. And maybe the photos will show something on that.

SC Right. Okay.

PAO This is Apollo Control. We've had loss of signal from Apollo 12 as it went behind the Moon on the 39th revolution some 45 minutes from acquisition of signal. We're now in a orbit measuring 64 by 56.7. The lunar orbit plane change maneuver number 2 was on time and was 1/2 foot per second more than the predicted. Present velocity 5364 feet per second. And at 160 hours, 16 minutes ground elapse time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control, 161 hours ground elapsed time. Less than a minute away from acquisition on the 40 revolution as Apollo 12 comes around the visible face of the moon. The crew is still taking various photography excercises and during this pass, we will attach the 16 milometer motion picture camera to the optics of the navigation sexton using the optics for the actual photography. Terminator to terminator beginning at about 161 well as you were. Now 160:57 going through 161 150 ground elapsed time. We are standing by now for acquisition should have it by now. We will stand by.

CAPCOM Apollo 12, Houston. Standing by.

SC Roger. We are working this stereo strip right now, Ed. Going real well.

CAPCOM Real good Dick.

SC Hey, Ed, listen I screwed up on that, but we sure are getting a lot for you so see if those guys can give us those 4 minutes on that last (garble) would you?

CAPCOM Okay, understand the request Dick we don't place too much importance on that, if you want it, we can give it to you.

SC It has our flight plan, so it is important to me.

CAPCOM Understand that, Dick.

SC We will get it on the fly by.

CAPCOM Say again, 12.

SC I just said we would get it on the fly by.

CAPCOM Roger.

CAPCOM 12, Houston. We suggest now 91.

SC Roger.

SC Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC We got Dick working this gas and Al and I are sight seeing. This is really the first chance we have had to get a good look at the moon, so we are enjoying this pass with the map, by checking off all the craters.

CAPCOM Roger, Pete, understand. Does it look any different after being down there, you get a little better feel for what it is like?

SC Well, I think so, of course, the backside there doesn't really look anything like what we were on.

CAPCOM Roger.

SC I seriously think Ed, it is more spectacular from orbit that you can see all these gigantic craters and all diameters of the moon and it's change in color. When you get on the surface - it's interesting down there naturally, but it is not too much unlike, being in a big field of clumps on earth. You have got to have (garble) around it. Not that much difference, then on earth (garble) and (garble) down here.

CAPCOM Do you think that will satisfy Dick?
SC No, well I don't know we were talking
about making a little pass over the landing sight before we
go. And I may get another chance, you can't ever tell.

CAPCOM Hope so.
CAPCOM You mentioned that backside looks different,
does it - just a different crater density or entirely different
nature to it?

SC Looks like different nature to me.
SC (garble) backside like everyone said is -
CAPCOM Go ahead.

END OF TAPE.

CAPCOM 12 -
SC The backside, like everyone said, is a -
Go ahead, Ed.

CAPCOM No, go ahead, Al.
SC I was just going to say it's just like everyone said before. The backside is a lot more worked over, a lot more worn and smooth and where the front sides got all these mare areas and lots more contrast and a lot more sharp features. I personally like to look at the front side, the hills and the higher mountains, the contrasts and the mares if you didn't realize it.

CAPCOM Roger. Probably that sun angle has a lot to do with how treacherous some of those mountain sides look.
SC That's right, Ed. On the backside here there's no flat area at all. It's all (garble) big craters, little craters. No real sharp contrast between flat and high mountains or anything like that.

CAPCOM It must have been an interesting approach going down there. You had some pretty steep material you were flying over there at pretty shallow sun angles.
SC You mean the PDI?
CAPCOM That's affirmative.
SC Yes. Well, at first we - the last time I saw it coming up on PDI it looked like we were really ordering in to going through some mountains, but I just kind of occupied watching the descent deposit it there and I only flinched over and I first looked I didn't have the foggiest idea where I was and then all of a sudden the old pattern was sitting right there.

CAPCOM Just like the Cape, huh?
SC I was just a - then I did a little LPD and - Yes, just like it, and I did just a little LPD mainly to - just a little to get out of the crater, not to get to it, because it looked like we were going to land right smack in the bottom.

CAPCOM We've got a Fido down here telling me about a prediction of such a feat.
SC Hey, a - For all I know he could be right. It sure looked like we were going right in the row of the crater. We've got a beautiful sight, Ed. Headed out from POI to PDI we already entered the PDI attitude and just as the front near Vega (garble) at that time an Earth rise occurred and it was a pretty beautiful sight. It occurred very rapidly (garble) and it's just such a fantastic view, blue and white shining - just a sort of a smeared sort of a map - gray or brown or whatever color you can call for. It's just a spectacular sight.

CAPCOM Roger, Al. Say, you're a bit broken up. Why don't you try moving the mouthpiece.

SC Will do, Ed.
CAPCOM 12, we have a little lunar news for you, if you're interested.

SC Did you hear what sight that I saw? Okay.
CAPCOM Okay, Pete and Al. Dick, you got a central station down there and the power is good and you got a good signal. Average temperature now is about 72 degrees and it's slowly increasing about .6 degrees per hour. The biggest thing that happened recently was the impact of the ascent stage and the PSE picked that up very well. They consider that one of the most significant things that's happened to date on lunar seismology. The LSM is working real well. They just did a flip cal on it. They did the flip cal before ascent and they also noted at ascent that the magnetic field blanked out at ignition and lasted - the blankout lasted for 10 to 12 minutes after. The solar wind has its covers off and is perking right along. The site also picked up some counts in the high energy range of the detectors at ascent and they also think they have a probable pickup of the impact itself. However, the side is still - continues to short out occasionally and they think it's just degassing so now they have the high voltage off and they'll probably bring it back on around lunar noon. Other than that it looks as though it's really perking right along. You did a swell job.

SC Hey, Ed. What's their best estimate now of the effect of all the dust it got on it? The equipment we laid down there?

CAPCOM Okay, from what we can see down here there's no observable effect.

SC That's going to be very interesting because I wonder what happened to the EASEP and - because honestly you couldn't have blown - I couldn't have blown any more dust on that EASEP than we got on our ALSEP and - that thing really got dirty. (garble) spoilers we needed and everything else. You just can't help but get them real dirty. Oh, it's not that dirty, but they did have ground dust on it.

CAPCOM Roger, Pete.

SC You can see from our pictures when we get them back exactly how dirty it was. Yes, I was going to say a minute ago, Ed, the only other sight that I thought was spectacular was ascent from the moon and when that thing's ready to bang and stage it started straight up and actually goes pretty fast - it was a little slide and it tipped over somewhat. I could look straight down and see the descent stage and see the ALSEP - see that we hadn't knocked over any parts of the ALSEP. It didn't look like anything big was being blown that way. I had the camera mounted in the window pointed - to a pilot's eye view. Instead of pointing down, so I could read it I had it down on the window pointed

SC straight ahead and it would have caught the same view we were getting only the thing stopped some time and I'm not really sure when and I'm just hoping that it didn't stop before we lifted off and made that pitch over. Because that'll be spectacular to look at on the movies. I started it again a couple times as you know during the ascent and it still shut down. It worked all the time during the descent but something happened.

CAPCOM Roger, Al. Sure hope you did catch that. Yes, that was a concern perhaps of that side being pretty susceptible to tipping over there especially from anything blowing out on the - from the ascent itself. Glad to hear it didn't.

SC Yes, I'll tell you one thing, Ed. You and Joe and all the guys put together a great lunar surface LM. That thing went without a hitch.

CAPCOM Well, we think you guys were the prime movers from the beginning and the hitches that did come up you sure knew how to work around them. Well done.

SC Anybody could swing a hammer.

END OF TAPE

CAPCOM 12, Houston. We're standing by with a map update for REV 41, TEI pad, REV 43, and some time for high resolution photos on decor and FRA mauro.

SC Okay. We're ready to copy.

CAPCOM Map update, REV 41, 162:13:27; 162:38:38, 162:59:49; TEI pad, REV 43 SPS, G&M, 34235 minus 064 plus 024, 168285272, NOUN 81, plus 29447 plus 02719 minus 00790, NA pitch is 126 and NA, four jets, 11 seconds. Readback.

SC Roger. On the ARS LOS (garbled) I got that.

SC And the TEI pad is SPS, G&M 34235 minus 064 plus 024, 168285272 plus 29447 plus 02719 minus 00790, NA 126, NA four jet 11 seconds.

CAPCOM That's Charlie. And we've got times for - -

SC Roger, roger.

CAPCOM We have your times for high resolutions photos on decor and FRA mauro when you're ready.

SC Go ahead. Ready to copy.

CAPCOM Okay. Decor, T1, 163:29:12, T2, 163:33:12, roll, pitch and yaw, you can use the attitudes in the flight plan. FRA mauro T1, 163:40:01, T2, 163:44:01, and again, roll, pitch, yaw, angles are the same as in the flight plan.

SC Roger, Ed. Copy 163:29:12, 163:33:12, for FRA mauro 163:40:01, 163:44:01, and the r, p, y is in the flight plan.

CAPCOM That's correct.

CAPCOM Pete, Houston.

SC Go ahead.

CAPCOM Say, in looking over the transcripts of the EVA, Yul figures you saw some pretty interesting stuff down there. As a matter of fact, he figures about 11 times.

SC Okay. Very good. That's not too bad for 8 hours.

CAPCOM That's for sure.

SC There really ought to be a (garbled) by not committing yourself.

CAPCOM Say again. You were a bit broken.

SC I said you really ought to be a test pilot by not committing yourself.

SC It's called weavel wording.

CAPCOM Guilt by association.

SC While we were passing over the crater can right now and it has a large impact crater in the middle of it that's got blocks so big in it that I can see it with my naked eye laying down there. So they got to be awful big.

CAPCOM What must be looking at chunks of the real bedrock.

SC Yes. And from here, of course, this is a impact crater, and the rocks laying out there are pure white in contrast to a rather dull gray (garbled) the rest of the crater can.

CAPCOM Roger. You made that comment also on the surface about some of those which were pure white. Do you think it's just the sun angle or do you think that's the real color?

SC I don't know. I guess we're at high noon now - we're at high noon now and it may be the sun angle because we, of course, were sitting on the surface and the sun relatively low, shining across at those rocks. But no matter how you slice it, anywhere along in here, no matter what the sun angle is these white craters appear to be white like chalky color with blotches on them. As a matter of fact, we're passing over a bunch of them now, and I can see boulders with the naked eye and I can see them real clearly with binoculars.

CAPCOM That would make a very spectacular descent from low gate.

SC Yes. And also - -

END OF TAPE

SC Hey, Ed, I was just looking at the flight plan and noticed what time it was back there. How come you get all the good deals?

CAPCOM Guess I'm just lucky.
No, I'd just as soon be up during the middle of the night rather than be up during the day and watch you guys sleep.

CAPCOM Apollo 12, Houston.

SC Okay, Houston, 12 (garble)

CAPCOM Okay. You're clear but there's an awful lot of static. We'll be picking a little bit of COM from you shortly.

SC Okay, Ed. Just looking at the flight plan and noticed what time it was back there. How come you get all the good deals?

CAPCOM Well, it's a good deal. I'd rather be up when you're up than watching you sleep during the day.

SC Yes. That's true.

CAPCOM Paul White said I've become a sleep expert.

CAPCOM Apollo 12, Houston. High gain angles, pitch minus 22, yaw 175.

SC Roger.

CAPCOM 12, Houston.

SC 12.

CAPCOM Okay. That's much better. Say on that question you brought up before about having that hot engine and looking at the return. If we did it the way you suggested, we'd be -

SC Wait just a second Ed.

CAPCOM Okay.

SC Okay, Ed. Go ahead. Sorry, we were trying to - Al and I were trying to pick up this Snow Man from here.

CAPCOM Did you get him?

SC Yes. I've got him in the binocular.

CAPCOM Okay. On the question that you brought up before, it looks as though your Delta V capability will be around 20 feet per second margin. And that looks a little bit small.

SC Okay. No problem. We weren't sure, we just knew that if we had a better engine or so well there was a chance that we wouldn't have anything to do. But there is no problem at all.

SC That's one less day in the LRL, Ed.

CAPCOM That's right. I think you probably got a little better place to spend it there.

SC It's right, Ed.

CAPCOM I bet you there are a lot of guys that are sitting over in the LRL that wouldn't mind trading you a day or two.

SC I suppose you're right.

END OF TAPE

CAPCOM Apollo 12, Houston. We suggest a zero degrees on the shaft.
SC Okay.
CAPCOM 12, Houston, go ahead.
CAPCOM Honeysuckle on net 1. Honeysuckle contact Houston, contact net 1 voice check.
HONEYSUCKLE Honeysuckle, we read you loud and clear.
CAPCOM Roger. Read you the same.
HONEYSUCKLE Houston calling back Honeysuckle net 1. We could possibly have a remoting problem in half we're not copying spacecraft being remoted to Gulf. We're checking.
CAPCOM Roger.
CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Okay, 12. We had a little bit out of configuration here and we're squared away now. Did you call?
SC No, we didn't. I guess Dick wanted to ask about the gyro torquing angles but we had gotten a P50 done - 2 done early the last time and probably passed them to you.
CAPCOM Okay. Apollo 12, Houston. You can continue with the pitch. We have the DSE dump. You can continue on to the Decor attitude.
SC Okay.
CAPCOM 12, Houston.
SC Go ahead, Ed.
CAPCOM Say Dick, in order to help Fido out a little bit would you try to do the dumps on the back side where possible.
SC Sure thing. I just couldn't wait any longer.
CAPCOM We'd like to see the back side of the Moon.
SC If you know what I mean.
SC Say that again.
CAPCOM After watching you on the front side, we'd like to see what the back side looks like.
SC Okay.
CAPCOM Apollo 12, Houston. Would you verify the recorder switches in the forward position?
SC Roger, in the forward -

END OF TAPE

SC Roger and a forward.
CAPCOM Thank you.
SC Did you want it off Houston?
SC Houston, Apollo 12, did you want us to
put that switch in forward where it is now, or put it back
to off?
CAPCOM Stand by.
CAPCOM Al, what we want is the tape record
switch to forward, if it is not there already.
SC That's where she is and that's where
she will stay.
CAPCOM Apollo 12, 1 minute to LOS.
SC Roger.
PAO This is Apollo Control, at loss of
signal as Apollo 12 went behind the moon on the 40 - near
the end of the 40 revolution. And some 45 minutes 35 seconds
until acquisition again. And at 162 hours 14 minutes ground
elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control Houston at 162 hours, 59 minutes now into the flight of Apollo 12. Apollo 12 will come within acquisition range in less than a minute. In Mission Control Center meanwhile, we had a shift turnover. Flight Director Pete Frank presently aboard and Capsule Communicator Gerry Carr has replaced Ed Gibson at that console. We'll stand by now for acquisition.

CAPCOM Apollo 12, Houston is listening.

SC Roger, Houston. 12 here.

CAPCOM Roger, Pete. Loud and clear.

SC How you doing this morning, Gerry?

CAPCOM Good. How you feeling?

SC Great. Well, Dick and I are trying to find some Pl right at the moment we're right about -

SC Pete and I are finally getting our first look at the Moon. Just kind off sky larking.

CAPCOM Kind of nice to kind of get back away from it and look at it from a distance, huh.

SC Yeah. We had - we didn't get a chance before we went down to look at it. We always had something going on and as a result we just got glimpses. We've had a couple of orbits here where we've been heading down and taking some photographs. We haven't had a monitor (garbled) keep closely because they bend down every 20 seconds by the intervelometer and been able to look out the window.

CAPCOM Houston. If one of you can find a pencil I got a Rev 42 map update for you.

PAO That was Al Bean saying that it was good to have a chance to take a over view or a long look at the Moon from a bit of a distance. We're at 163 hours, 2 minutes presently into the flight.

SC Okay, Gerry, I'm ready to copy.

CAPCOM Okay. Map update for Rev 42, LOS is 164 12 05 164 37 09 164 58 26. Over.

SC Roger. 164 12 05 164 37 09 164 58 26.

CAPCOM Affirm.

PAO Apollo 12 now on its 41st revolution. We presently show an altitude of 58.3 nautical miles above the surface of the Moon. Its current orbit 64.6 nautical miles by 56.4 nautical miles.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 CST 05:31 GET 163:09 504/1

CAPCOM Apollo 12, Houston.

SC Go.

CAPCOM Roger. If you'll give us ACCEPT we'll start our uplink of your CSM state vector on low bid rate.

SC Okay.

PAO This is Apollo Control, Houston, at 163 hours 20 minutes now into the flight. Very little conversation on the loop. The Apollo 12 crew no doubt involved in preparations for tracking and photographing potential future landing sites. Meanwhile, in Mission Control Center, Houston, flight director Pete Frank confirms that we do not plan for an early return - a one day early return for the Apollo 12 crew. We're at 63 hours 21 minutes into the flight. This is Apollo Control, Houston.

CAPCOM Apollo 12, Houston. The computer's yours.

SC Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, 06:12 CST, 163:50:00 GET 506/1

PAO This is Apollo Control, Houston. 163 hours 50 minutes now into the flight. Those pads just passed out by CAPCOM (garbled) to Pete Conrad, were pads for landmark tracking. The CP1 and CP2, CP an acronym of control point. We're at 163 hours and presently show an altitude of 60.1 nautical miles. And this is Apollo Control, Houston.

CAPCOM Apollo 12, Houston. Go low bit rate on PCM.

SC I just got to put the full (garbled) right now, huh, Jerry?

CAPCOM That's affirmative, Pete. I got a look at it coming into work this morning and it's almost completely full and it's beautiful. Houston's enjoying - -

SC It's really been spectacular over here by the terminators. We're moving in a lot of stuff, I guess everybody's seen before that's been up here.

CAPCOM Roger, Pete. Houston, down here, is enjoying good cold clear weather and so the Moon is particularly beautiful.

SC Sounds good.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/21/69, CST 06:22, GET 164:00 507/1

SC Houston, 12. We got the (garble) for the DSKY.

CAPCOM Affirmative Pete.

SC Okay.

PAO This is Apollo Control Houston, at 164 hours 9 minutes now into the flight and we are less than 3 minutes away from time of loss of signal. We will stand by to see if capsule communicator Jerry Carr has any final words with the crew before they pass out of range.

CAPCOM Apollo 12, Houston.

SC Go ahead Houston.

CAPCOM Roger, your about a minute from LOS, we will be picking you up again at 164:58 and your waste water dump on the backside, dump to 15 per cent. Over.

SC Roger, see you at 58, move out the 15.

CAPCOM So long Pete.

PAO This is Apollo Control Houston, we've had loss of signal with the Apollo 12 Command Module as it passes above the far side of the moon. We reacquire Apollo 12 at 164 hours 58 minutes into the flight.

END OF TAPE.

PAO This is Apollo Control Houston at 164 hours 58 minutes now into the flight. We're some 20 seconds away now from acquisition and standing by.

PAO This is Apollo Control Houston. We've had no contact yet with the crew, although we are receiving data. Presently we show the onboard computer in Program 22. This is the orbital navigation program. We'll stand by now for any conversation as it may develop.

PAO This is Apollo Control Houston now 165 hours 3 minutes into the flight. We presently show an apolune of 64.7 nautical miles and a perilune of 56.1 nautical miles for Apollo 12. Apollo 12's current weight in orbit 34 163 pounds. Standing by and continuing to monitor, this is Apollo Control Houston.

PAO Apollo Control Houston. Apollo 12 performing several landmark tracking exercises as we pick them up this rev. A report from the guidance and control officer over the loop indicates that 12 has completed its first landmark tracking exercise. We're at 165 hours 5 minutes now into the flight. This is Apollo Control Houston.

PAO This is Apollo Control Houston now 165 hours and 12 minutes into the flight. Capcom Jerry Carr has not yet tried to call Apollo 12, the crew of Apollo 12 till actively engaged in their landmark tracking project. We will stand by and continue to monitor and we are at 165 hours 12 minutes now into the mission.

END OF TAPE

CAPCOM Apollo 12, Houston, do you read?
SC Under control. Go ahead.
CAPCOM Okay. Just checking in. I've got a
map update and a TER 45 block data, whenever you're ready to
copy.
SC Jerry, can you read in between runs, here?
CAPCOM Sure can. Call me when you're ready.
SC Okay. I'll have (garbled) after this one.
CAPCOM Okay.
SC Hey, Jerry. (garbled)
CAPCOM Roger.
SC Go ahead, Jerry.
CAPCOM Roger. TEI 45 block data. Put it on
a maneuver PAD. SPS G and N. 341 63 NA NA. NOUN 33 is
172 27 1643. NOUN 81, plus 302 79 plus 02 836 minus 000 93.
NA 122 NA. The rest of the PAD is NA ullege 4 jets 11 seconds.
Over.
SC Roger, Jerry. Copied NOUN 45 SPS G and N.
34163 NA NA. 172 27 1643 plus 302 79 plus 02 836 minus
00 093 NA 122 NA, 4 jets 11 seconds ullege.
CAPCOM Roger, and I've got a rev 43 map update
for you.
SC Roger.
CAPCOM Okay. Rev 43. LOS 166 10 37, 166 35
36, 166 56 58. Over.
SC Roger. 166 10 37, 166 35 36, 166 56 58.
CAPCOM Okay. Affirmed.
BEAN Have you heard from our families lately?
CAPCOM Oh, I expect that they are just up and
around this morning, and having breakfast, getting the kids
off to school. I guess when things slow down, what do you
say I give them a call and get some words.
BEAN That's a good idea. Thanks.
CAPCOM Is this Al?
BEAN That's right.
CAPCOM Did you get the word that Amy was visited
by the tooth fairy?
SC No. I didn't hear a word about it.
CAPCOM Yes, that happened when you guys were
getting ready to - for your descent. We didn't have time to
get that up to you, but Amy wanted me to be sure and tell you
that.
SC Thank you.
PAO This is Apollo Control, Houston at
165 hours and 19 minutes into the flight. That TEI 43 PAD
which was passed up by Jerry Carr to Al Bean is a maneuver
PAD which is stored inside the computer only to be utilized

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 165:13:00, CST 0735, 509/2

PAO - in the event a requirement existed to return Apollo 12 back toward the Earth on the 43rd revolution. It's contingency PAD only of block data. We're at 165 hours 20 minutes into the flight and continuing to monitor. This is Apollo Control, Houston.

SC Houston, 12.

CAPCOM 12, Houston. Go.

SC Jerry, go ahead with that second group of P22's, please.

CAPCOM Standby, Dick. We don't have them yet.

CAPCOM 12, Houston. We'll have those for you in just a couple of minutes.

CAPCOM Apollo 12, Houston. I have those land mark tracking PADS now.

SC Okay, Jerry. Go ahead.

CAPCOM Okay. These are the ones on page 3-149. The first one is CHARLIE POPPA 1, T1 is 166 51 23, 166 56 29, North 02. I will have the long information for you in a few minutes. CHARLIE POPPA 2, T1 is 167 09 42, 167 14 42, North 14. DELTA ECHO 1, 167 22 46, 167 27 43, North 02. FOX TROT Mike 1, 167 33 0 correction 32, 167 38 32, North 12. Over.

SC All right. That's CP1 166 51 23, '66 56 29, North 02. CP 2, 167 09 42, 167 14 42, North 14. DELTA ECHO 1, 167 2246, 1672743, 01 North. (Garbled). 167 33 32, 167 38 32, 12 North. Over.

CAPCOM That's affirmative. We'll have some other information here in just a minute.

SC Now you can (garbled) what it's doing right now, Jerry.

CAPCOM 12, Houston. We're going to take your NOUN 89's and convert that to your land longs for this particular pass. Over.

SC Oh, okay. I see.

CAPCOM Apollo 12, Houston.

SC Go ahead, Houston.

CAPCOM Roger. On that P22 stuff I just passed up to you, go ahead and use your flight plan land longs and mark on the same features that you did on the previous pass.

SC Okay, Jerry. Understand. We mark the same thing on this pass here.

CAPCOM That's affirmative.

PAO This is Apollo Control, Houston at 165 hours 33 minutes now into the flight. We presently show Apollo 12 at an altitude of 57 nautical miles and in an orbit showing an apolune of 64.6 nautical miles and a perilune of 56 nautical miles. We have some 37 minutes remaining on this

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 165:13:00, CST 0735, 509/3

PAO - front side pass. Apollo 12 is now
in its 42nd revolution around the Moon. We're at 165 hours
34 minutes, and continuing to monitor. This is Apollo Control,
Houston.

SC - Apollo 12.

CAPCOM Go ahead, 12.

SC Jerry, are we going to use the same onboard
that's in the flight plan or (garbled).

CAPCOM Dick, use the ones in the flight plan.
Not the NOUN 89's.

SC Okay. Thank you.

PAO That's command module pilot, Dick
Gordon talking with capsule communicator Jerry Carr planning
his second set of landmark tracking exercises. We're at
165 hours 35 minutes now into the flight.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 16536 CST 758 510/1

SC Houston; 12.
CAPCOM 12; Houston; GO.
SC Hey Jerry; have the boys check the
(garble) target (garble) 1/60th (garble) 126; will you check
on that?
CAPCOM Roger - which target was that?
SC This last one 01.
CAPCOM Okay.
CAPCOM Dick, while I have you, sometime on the
backside pass here, you can expect to see the manifold pressure
on RCS quad C start to decrease meaning that you have depleted
your primary tank. We'd like you to switch to secondary on
that quad only.
SC Okay. Okay, secondary on C only - thank you.
CAPCOM Do that just when the manifold pressure
starts to decrease -
SC (garble)
SC I was going to say - I've switched twice
to decrease.
SC Good show Dick.
CAPCOM 12, Houston - go ahead; we concur with
you on your setting for firm' all.
SC Okay I'll make it 1125th for our next
ass.
SC Roger. 1125/th.
PAO This is Apollo Control Houston at 165
hours, 45 minutes into the flight; that was Jerry Carr advising
Dick Gordon aboard Apollo 12 that they're approaching a
point to switch over to the secondary propellant tank on
quad C or quad charlie. This is one of the reaction control
system quads on the service module. We are at 165 hours, 46
minutes into the flight and continuing to monitor. This is Apollo
Control, Houston.
CAPCOM Apollo 12, Houston; comm check.
SC Loud and clear.
CAPCOM Roger; we have some data to uplink to you
soon as we can get good data.

END OF TAPE

SC 1 and 2 will be set Houston.
CAPCOM Roger, it's on its way.
CAPCOM Apollo 12, Houston. The computer's yours.
SC Thank you much.
PAO This is Apollo Control Houston at 166 hours
8 minutes now into the flight. We're slightly less than
3 minutes away from loss of signal with Apollo 12. We will
stand by for any parting messages from CAPCOM, Jerry Carr,
prior to Apollo 12 going behind the moon.
CAPCOM Apollo 12, Houston. Over.
SC Go ahead, Jerry.
CAPCOM Roger. We show you a minute and a half from
LOS and we'll be picking you up at 166 56 and would you pass
the word to Dick that the P22 marks are looking real good and
they're very consistent. About the only thing that we might
have to offer is that he's starting his marks just a bit too
early.
SC Roger. How much is a depth unit?
CAPCOM About 11 seconds.
SC We'll try to correct that one.
CAPCOM Roger. See you on the other side.
SC Okey dokey.
SC Houston, 12.
CAPCOM Go 12.
SC Hey Jerry, Al just put in a comment about
starting these a little early. I felt that I had to because
that last mark on the target is going out of sight; that's because
that DOD on the telescope is not as much as it is on the sextant,
and I think you've got to start a little bit earlier at
40 seconds after to get through and I've done that purposely.
Any comments.
CAPCOM Okay, that's fine.
PAO This is Apollo Control, Houston. 166 hours
11 minutes into the flight. Jerry Carr did not quite have
the opportunity to respond to that last comment from Dick
Gordon since Apollo 12 passed over the hill and out of
range with the Mission Control Center here in Houston. We're
at 166 hours 11 minutes and we'll see Apollo 12 some 45 min-
utes later as it is presently on its 42nd revolution. This
is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston at 166 hours 57 minutes now into the flight. We're just a little more than 10 seconds away from time of acquisition on the Apollo 12 Command Module and we'll standby.

CAPCOM Apollo 12, Houston. How do you read?

SC Hello, Houston, Yankee Clipper.

CAPCOM Roger. Read you loud and clear.

SC Okay, Houston, you're breaking up.

CAPCOM Yankee Clipper, Houston. How do you read me now?

SC Roger, loud and clear. Listen Jerry, I've got something real important for you. We were taking some target of opportunity photographs with the same film pack that we had the 500 millimeter film on, and we're not going into details right now. I'll tell you later when we have the time; the magazine dropped off and we're not sure we wiped out that film magazine. Now, what we suggest is that we dump the landmark tracking; we got good ones last time on Descartes and Fra Maurd and then pump us up another P1 and P2 for both of them and then get somemore 500 millimeter on this pass on another magazine, okay?

CAPCOM Roger, Pete. We copy. Stand by 1.

SC Okay.

PAO This is Apollo Control Houston. You heard that report from Pete Conrad stating that they were taking target of opportunity photographs and knocked a 500 millimeter magazine off the camera. The request he has in with Mission Control Center now is to substitute additional target of opportunity photography for landmark tracking on this revolution. We'll stand by for that decision.

CAPCOM Yankee Clipper, Houston.

SC (garble)

CAPCOM Roger. We concur with your plan, Pete, and we're hustling right now to get some new T, T2 times for Descartes and Fra Mauro.

SC Okay. Let me tell you what happened. Al was very careful to watch while we were taking the 500 millimeter pictures to make sure that the camera was in fact running, and he was watching the side opposite the camera, which has the little red and white deal and, I mean he was watching the red and white thing that takes the picture and we noticed that (garble) and we kicked that around for quite awhile till we finally concluded, because Al had been watching this, that there was something wrong with the counter and we really had taken all the pictures so we decided that we'd use up the rest of that film on target of opportunity; so while Al was taking the pictures out the window, the side of the magazine just popped off out of nowhere for no reason, and opened up about an eighth of an inch and Al tried to get it back on and

SC he had to actually open the lock and put it back on. We never did get it on so he just taped it on and we don't know whether it took or not and we don't know why it knocked open, but we're sure - we also don't know cause it was only partially on that we really got good film so I think that it would be better that we take some more film and we'll get those pictures again.

CAPCOM Roger, Pete. That sounds like the best way to go.

SC Okay.

CAPCOM Yankee Clipper, Houston.

SC Go, Houston.

CAPCOM Roger. I've got your T1's and T2's, and we'll have some attitudes for you shortly. Ready to copy?

SC Yes sir.

CAPCOM Okay. For Descartes, tango 1 is 1672605, tango 2 is 1673005, for Fra Mauro, tango 1 is 1673658, tango 2 is 1674058 and we'll have your attitudes for you in a few minutes.

SC Okay, and don't forget to work up that same data for (garble) at REV for TEI there.

CAPCOM Roger. We'll do it.

SC Okay.

PAO This is Apollo Control Houston. You heard that last exchange between Jerry Carr and Pete Conrad aboard Apollo 12. The landmark tracking for this revolution will be deleted from the flight plan and those were GET times passed up for T1 and T2 on Fra Mauro and Descartes, 2 prominent candidates as landing sites for future Apollo missions. We're at 167 hours 11 minutes now in the flight and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 16712 CST 933 513/1

CAPCOM Yankee Clipper; Houston. While you
are waiting, I have a rev 44 update.
SC Okay, Houston.
CAPCOM Roger. LOS 168:09:05 168:33:57 168:55:10;
over.
SC Roger; 168:09:05, 168:33:57 168:55:10.
CAPCOM Roger, and I've got your attitudes for
descartes for tomorrow.
SC Go.
CAPCOM Roger. For descartes roll 1.1; pitch,
285.9; yaw, 1.6; for framorrow, roll 1.4; pitch, 252.0; yaw,
2.0.
SC Roll 1.1, 285.9, 1.6; 1.4, 252.0; 2.0.
CAPCOM Clipper, Houston. I did not read your
readback. You were broken.
SC Roger; roll 1.1, pitch 285.9, yaw 1.6;
framorrow roll 1.4, pitch 252.0; yaw 2.0.
CAPCOM That's affirmative.
SC Okay.
CAPCOM Clipper, Houston. If you did a P52,
we need a torquing time; over.
CAPCOM Clipper; Houston. I guess we need the
angles too; over.
SC Okay, Jerry; torquing angles are plus
.095, minus .088 minus .003; torquing time 164:00:63.
CAPCOM Roger; copied the time as 164:06:33 and
your torquing angles were plus .095, minus .088, minus .003.
CAPCOM Clipper, Houston; we assume then that you
did not do a P52, at about 165.50; over.
SC No.
CAPCOM Roger.
SC Yes we did. Excuse me.
CAPCOM Okay, those were the numbers we read -
SC (garble) plus .023, minus .003, plus
.073 plus 5165 5205.
CAPCOM Roger; time 1655205 and the angles are
plus .023, minus .003 and plus .073.
SC Okay.
SC Hey Jerry, those guys (garble) I didn't
see any difference in the first ones anyway.
CAPCOM Roger; Dick; judging from the results on
all the P22's you been sending down buddy; you're the expert.
SC (garble)
SC Hey Jerry, tell (garble) also that on
P22, we did pick that northern crater - the one that he's got
in the catalog (garble) see in the film.
CAPCOM Roger - that's the one you remarked on;
right?
SC Yeah, just this once; and I marked on the
one he has in the film, but the coordinates are actually for the
northern crater.

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 16712 CST 933 513/2

CAPCOM Roger Dick; understand.
END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 CST 0948 GET 167:27 514/1

CAPCOM Clipper, Houston, how do you read?
SC Loud and clear.
CAPCOM Okay. We got you high gain and reading
you loud and clear now.
SC Okay. We're just finishing up the carton.
CAPCOM Roger.
SC We've got the box all taped up this time.
CAPCOM Roger, good recovery, guys.
PAO This is Apollo Control Houston at
167 hours 30 minutes. The reference to the box all taped up
no doubts refers to the camera. On previous photography
taking target of opportunity photographs, the 500-mm magazine
was knocked off the camera. As you had heard earlier, the
Apollo 12 crew is repeating photography of future potential
landing sites, these being Fra Mauro, Descartes, and Lalande,
which will come on a later pass. We're at 167 hours 31 minutes
and continuing to monitor. This is Apollo Control Houston.
CAPCOM Clipper, Houston, how do you read now?
SC Loud and clear.
CAPCOM Roger, we're reading you weak but clear
now. We're on backup equipment Honeysuckle.
SC Okay.
CAPCOM Loud and clear now, Pete.
SC Okay.
SC Okay, Houston, we got Fra Mauro.
CAPCOM Roger, Pete.
PAO This is Apollo Control Houston. We
are at 167 hours 46 minutes into the flight. We presently
show Apollo 12 with an apolune of 65 nautical miles and a
perilune of 55.7 nautical miles. 12's present altitude
60 nautical miles, now traveling at a speed of 5347 feet per
second. We are standing by for any further conversational
exchanges between capsule communicator Jerry Carr and
Apollo 12.
CAPCOM Yankee Clipper, Houston.
SC Go Houston.
CAPCOM Roger, Pete. We've had a meeting of
the minds here, and the tentative plan right now is to drop
the stereo photos, stereo strip work on rev 44 because it
has a lower priority than the landmark tracking, and so we
want to be prepared for landmark tracking on the next rev.
We'll have pad data available for you by AOS, and what we
are going to have to do now is uplink you a new state vector
and have you do the P52 on this pass. Over.
SC Okay, (garbled) landmarking tracking,
is that right?
CAPCOM That's affirmative, Pete.
SC Okay.
CAPCOM So if you go P00 and -

END OF TAPE

SC Okay.
CAPCOM So, if you go P00 and accept, we'll run your state vector up.
SC Got it.
CAPCOM Okay. It's on the way.
SC Hey, Houston. Yankee Clipper, here.
When we skipped the last test doing the STEREO's, there could have been a little grab in the line in the middle of it. Get it all that way.
CAPCOM That sounds like a sterling proposal, Pete.
SC Okay. We'll do that on the last rev, and we'll break right in the middle there (garbled) and go back to it. That'll take care of the whole show.
CAPCOM Clipper, Houston. You mentioned LeLande and that confused us. Say again.
SC On the very last rev, we want to photograph LELANDE, with the 500 millimeter.
CAPCOM Roger. We're with you now.
SC Okay. So all we need from you is the T 1 and the times for Decartes and Fra Mauro. We'll get them on the next pass. Then we need a T1 time for 500 millimeter on LeLan. On the next pass, which is the pass we burn TEI on, and we'll STEREO strip her up to that point. Rev LeLan, keep on going STEREO, strip her and burn TFI around the corner.
CAPCOM Standby, Pete. Clipper, Houston. The computer is yours.
SC Okay. Al, we'll give you a P52 in about 2 minutes here.
CAPCOM Roger. While you're waiting, Pete. I've got messages from the families.
SC Go.
CAPCOM Okay, Pete. Your kids - I called them this morning about 8:30 - your kids are off to school and Jane says that you're doing a great job and that she's really proud. They're all waiting anxiously for all three of you to get back. Dick, Barbara said that you're doing a fabulous job and she sure wishes you could get some rest, so she could. Al, Sue says that she spent the evening with Jane, and they had a lot of fun last night, and they both feel real good about everything. She's now in a watching and waiting mode.
SC Okay. Thank you, Jerry. Thank you.
CAPCOM Copy P52.
SC (garbled) alignment.
CAPCOM Roger. We copy.
SC Houston, Clipper.

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 167:52:00, CST 1013, 515/2

CAPCOM Go ahead, Clipper.
SC Okay now at 170 hours, we going to do
this P52 option 1. So, make sure SAO gives us gimbal angles
to LeLande would the right - with the fact that we've got the option 1
in for TEI - okay?

CAPCOM Roger, Pete.

SC Say again.

CAPCOM Will do it, Pete.

CAPCOM Clipper, Houston.

SC Go ahead.

CAPCOM Roger. We're a little concerned about
doing your STEREO strip work on that last rev prior to TEI.
We think that might squeeze some of the targeting near the
end there, and we think you'd be better off if you did your
STEREO Strip work on rev 44. I have some T1 and T2 times for
you.

CAPCOM Clipper, Houston. The plan is to do
your STEREO photos up until to the landmark tracking time,
and then terminate the strip photos and do your tracking.

SC Okay, Jerry. Give me the T1 and T2
times for Descartes, Fra Mauro.

CAPCOM Okay. Terminate your battery B charge
and your STEREO photos for rev 44 are T1 of 168 54 00, 169
10 00, and we'll have your T1 and T2 times for AOS for the
other work.

SC I understand T1 and T2 for rev 44
STEREO strip, 168 54 00, 169 10 00.

CAPCOM Roger, and we'll have your time for
the landmark tracking as you come around the horn.

SC Okay. Very good.

PAO This is Apollo Control, Houston at
168 hours and 4 minutes now in the flight. There you got
our flight plan update for rev 44 which will become a combination
of 2 items, STEREO strip photography plus landmark tracking.
They will do the STEREO strip photography up until their
time that their landmark tracking coordinants come up and
switch over at that point. We're less than 4 minutes away
now from loss of signal with Apollo 12. We'll standby for
any other conversations.

CAPCOM Yankee Clipper, Houston.

SC Go ahead.

CAPCOM Roger. The fuel manifold pressure
on all your quads is started down, so go ahead and switch
all four quads to secondary. We're looking for LOS here in
1 minute and 30 seconds and we'll see you coming around the
horn at 168 55. Over.

SC Okay.

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 167:52:00, CST 1013, 515/3

PAO This is Apollo Control, Houston. The reference there by Cap Com, Jerry Carr was to switch all 4 of the service module or CS quads to their secondary tanks to throw what are known as 4 VW valves. We're at 168 hours and 8 minutes. Less than a minute now away from loss of signal.

CAPCOM So long, Clipper.

PAO This is Apollo Control, Houston at 168 hours 9 minutes now into the flight. Apollo 12 has passed out of site and range on its 43 revolution around the Moon with plans for returning on the 45th revolution. Yankee Clipper now certainly with more revs under its belt than any of its Apollo predecessors in lunar orbit. Apollos 8, 10, and 11. Ten and 11 both with 31 revolutions a piece. Of course this makes Dick Gordon, although he didn't step foot on the Moon, becoming the unquestioned record holder for time spent in lunar orbit. We'll pick up Apollo 12 in approximately 45 minutes. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 11:17CST GET 168:55:00 516/1

PAO This is Apollo Control, Houston at 168 hours 55 minutes now into the flight. We're less than 30 seconds away at this time from reacquiring Apollo 12, so we'll stand by and listen.

PAO We're receiving data at this time from the spacecraft but Jerry Carr our Capsule Communicator has not yet attempted to contact the crew.

SC Hello, Houston. Clipper ready to copy DE 1 and FF 1.

CAPCOM Hello, Clipper. This is Houston. Roger. P22 tracking update. Your target is Delta Echo 1, T 1 is 169 21 10 169 26 04, north 05; the lat long and altitude are unchanged from your last pad. For the second target Fox Trot Mike 1. T 1 is 169 31 55 169 36 53, north 16. Lat long and altitude no change. Over.

SC Roger. Delta Echo 1, 169 21 10, 169 26 04, north 05; SM 1, T 1, 169 31 55, 169 36 53, north 16 and lat long unchanged on both.

CAPCOM That's affirmative, Pete, and I've got your REV 45 update. Are you ready?

SC Go ahead.

CAPCOM Okay, REV 45 map update; 170 07 19, 170 32 25, 170 53 40. Over.

SC Roger, copy. 170 07 19, 170 32 25, 170 53 40.

CAPCOM Affirmative and I've got a TEI 45 preliminary for you.

SC Okay, wait one.

CAPCOM Okay, that's a maneuver pad, Pete.

SC (Garble - too faint).

SC Okay, play it.

CAPCOM Roger, preliminary. TEI 45, SPS G&N. NOUN 47, 34 163 minus 064 plus 024. NOUN 33, 172 27 16 15. NOUN 81, plus 30 274 plus 02 978 minus 00 196. Roll, pitch and yaw, 180 all zips, all zips. NOUN 44, both NA. Delta VT, 30 421, 210 302 09. Sextant, 01 232 9, 237. Bore sight, 041. Down 016. Left 48. NOUN 61 minus 1582 minus 16500. EMS, 117 12 36198. GET of O5G is 2 44 21 55. GEC align on Sirius and Rigel. Roll is 138. Pitch 079. Yaw 002. For jet ullage 11 seconds. Over.

SC Roger, Houston. Copy 34163 minus 064 plus 024. 172 27 16 15 plus 30 274 plus 02 978 minus 00 196, 20 0 000 000, NA - NA 30 421 (garble) 0. 30 20 9, 01 2329, 237, 041. Down 016, 148 minus 1582 minus 16500, 117 12 36198, 2444 211 55. Let's go back up to the sextant out at the bore sight star (garble) 64B, I think that should have been 64A, Over.

CAPCOM That's negative, Al. That's an L for left 48.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 169:05 CST 1127 517/1

SC 648; over.
CAPCOM That's negative A1; that's an L for
left 48.
SC Rog - understand.
CAPCOM Okay, A1, and did you copy the GEC
align stars and then the angles?
SC Roger; Sirius and Rigel 138 079002 4 jets, 11
seconds.
CAPCOM Roger; you got it A1.
PAO This is Apollo Control Houston at 169 hours
8 minutes now into the flight. You heard CAPCOM Jerry Carr
pass along the preliminary TEI revolution 45 pad, and we will
discern some of those numbers and pass them along to you.
The ground elapsed time for ignition included in this pad is
172 hours, 27 minutes, 16.15 seconds, with a DELTA velocity
in the X axis of plus 3 027.4 feet per second, with a burn
time of 2 minutes 10 seconds. The ground elapsed time for
.05 G based on this preliminary pad is 244 hours, 21 minutes,
55 seconds, with a longitude and latitude shown as 15.82
degrees south latitude, and 165 degrees west longitude. This
of course is a preliminary pad and will be updated. We are
at 169 hours, 9 minutes into the flight and this is Apollo
Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 169 hours 34 minutes into the flight of Apollo 12. We presently show Apollo 12 in an orbit around the moon of 65.2 nautical miles apolune and 55.5 nautical miles perilune. We've had no conversation with the Apollo 12 crew since we contacted them on the onset on this acquisition. The crew no doubt presently involved with their stereo photography and following that landmark trackinging of this the 44th revolution. Meanwhile, we have recieved a report that the ALSEP central station and all experiments continue to function at this time, 47 hours after deployment on the lunar surface by the crew of Apollo 12. Normal scientific measurements were supplemented by significant effects of the lunar module ascent and the impact of the empty ascent stage onto the surface. The impact point was 39 nautical miles from ALSEP and the resulting waves were seen by the passive seismic experiment for some 55 minutes. The magnetometer observed flux variations for about 10 minutes at the time of LM ascent. At 9:00 pm central standard time on November 20, it detected entry of the moon into the earth's magnetic tail. Removal of the dust covers from the sensors of the solar wind spectrometer were accomplished by ground command 1 hour after LM ascent. This event was detected by the passive seismic experiment. The solar wind's spectrometer instrument is now in full operation. Measurements of the suprathemal ion detector increased at the time of LM ascent. There was also a slight increase, which may be related to LM impact. High voltage power supplies in this instrument shut themselves off after an initial period of operation. Command turn on can be performed successfully, but subsequently cuts off. This is believed to indicate an outgassing of the instrument in the lunar vacuum, and should clear up after a thorough bakeout perhaps around lunar noon. We're at 169 hours 37 minutes now into the flight of Apollo 12 and this is Apollo Control continuing to monitor.

CAPCOM Yankee Clipper, Houston.

SC Go ahead.

CAPCOM Roger. Tracing looked real good. When you get to the P52 attitude, we'd like to have the high gain and we've got your REFSMAT for TEI coming up.

SC Okay.

SC There we go Houston. We're on the high gain.

CAPCOM Roger. Reading you loud and clear.

CAPCOM Clipper, Houston. If we can have a P00 and ACCEPT we will ship your REFSMAT up.

SC You can have it.

CAPCOM Roger. It's on its way.

CAPCOM Clipper, Houston. Got a special report for you on CSM consumables. We've had you doing so many off nominal things, we thought you'd probably like a quick off the cuff report. Right now you stand as of 169 plus 20, you stand with 37 percent RCS total and its altus 38 percent BRAVO is 37 CHARLIE is 37 and DELTA is 36. Over.

SC Roger.

PAO This is Apollo Control Houston at 169 hours and 51 minutes now into the flight. We've had relatively little conversation with the Apollo 12 crew on this the 44th revolution around the Moon. Jerry Carr just passed along a quick look at consumables aboard, referring there to propellants for the service module RCS quads, and at this time we show Apollo 12 in an orbit of 65.2 nautical miles by 55.2 nautical miles. Presently near its apolune with - showing an altitude of 62 nautical miles. We'll stand by and continue to monitor. We've got 15 minutes remaining until we lose signal with the Apollo 12 Command Module on this front side pass around the Moon.

CAPCOM Clipper, Houston. The computer's yours.

PAO This is Apollo Control Houston at 170 hours 4 minutes now into the flight. We're less than 4 minutes away now from scheduled time of loss of signal. We'll stand by and continue to monitor for any final calloffs that Jerry Carr might make to the Apollo 12 crew before they pass out of range and over the farside of the Moon.

CAPCOM Yankee Clipper, Houston. You're 1 minute from LOS. Things are looking good and we're looking for you around the Horn at 17053. Over.

SC Roger. 17053.

CAPCOM Roger.

PAO This is Apollo Control, Houston at 170 hours 8 minutes now into the flight of Apollo 12 and we've just had loss of signal with the command and service module as it - as the spacecraft with the Apollo 12 crew passes above the back side of the Moon. Meanwhile in Mission Control Center, Houston, we're undergoing a change of shift among Flight Controllers. Flight Director Pete Frank and his Orange Flight Control Team will be leaving their consoles and be replaced by Flight Director Jerry Griffin and the Gold Flight Control Team. As Pete Frank's group of Flight Controllers came on duty this morning, the crew was awake, however, it had been previously reported by the crew that Pete Conrad slept some 4-1/2 hours during the rest cycle and Al Bean reported 4 hours and Dick Gordon 4 hours, somewhat under the period of time allocated as a 7-1/2 hour rest period. During the day, the crew showed some signs of weariness, no doubt accumulated from the busy schedule of the preceding days. They lacked some of the exuberance and tendency to talk that they have shown during the more active periods of their lunar flight. The day itself was spent in photography of a possible future Apollo landing site and landmark tracking. When Pete Conrad reported that a 500 millimeter magazine was knocked off of the camera, the Control Center and the crew of Apollo 12 became involved in what was termed by 1 of the Flight Controllers in the Mission Control Center as Gemini type flight planning, real time changes in flight. On REV 33

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 1695100, CST 1213 519/2

PAO landmark tracking was replaced with a repeat of the photography of the Descartes and Fra Mauro sites. On the front side pass, REV 44, the Apollo crew did a combination of stereo photography and landmark tracking. Also at the request of the Mission Control Center, Apollo 12 switched over to the secondary propellant tanks on the 4 RCS quads on the service module. At the start of - at the onset of acquisition of the 44 revolution, a preliminary PAD for TEI was passed up to Pete Conrad who copied down those numbers - a preliminary PAD, and there will be a final PAD that will be passed on to the crew just prior to the burn itself. We'll repeat again some of those preliminary numbers that were included in that PAD. The ground elapsed time for ignition, 172 hours 27 minutes 16.15 seconds. The total DELTA V of 3042.1 feet per second, posigrade burn of course for this return trip from the Moon, and a burn duration of 2 minutes 10 seconds. We're at 170 hours 12 minutes into the flight of Apollo 12 and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 1703200, CST 1255 520/1

PAO This is Apollo Control at 170 hours 32 minutes. At 1:00 P.M. CST, 5 minutes from now, in the Houston News Center, there will be a briefing on the release of onboard photography. Repeating, the briefing on the release of onboard photography will begin in the Houston News Center in 5 minutes. This is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control at 170 hours 53 minutes. We're about 15 seconds away from acquisition of Yankee Clipper on the 45th lunar revolution. The CAPCOM on this shift is Astronaut Don Lind. We'll stand by for acquisition.

PAO We have acquisition of signal.

CAPCOM Apollo 12, Houston.

SC Hello, Houston, Clipper here.

CAPCOM Roger, we've got -

SC Hello there, how are you today?

CAPCOM Just fine, how's things up near the moon?

SC Not too bad but I think we're about ready to leave.

CAPCOM Well good, we'll be glad to have you back.

SC We haven't met anybody up here.

CAPCOM Hey, listen I've got some times -

SC We haven't got any stages.

CAPCOM Thank goodness. Hey, Dick, we've got the state vector in the target mode for you anytime you want to give us the computer and also I've got the data for the higher resolution photography pad for Lalande, but we want to make sure that you understand that. This is your option. We don't want to press you too much on the last pass before TEI, so if you want to do it fine. We'll appreciate it. If not -

SC Al, what's your option? Don we understand this and we want to do it because I messed it up myself this morning. I want to get it.

CAPCOM Okay (garble) information.

SC I'll give it another chance.

SC Go ahead, I'm ready to copy.

CAPCOM Okay. T 1 is 171 30 52, T2 is 171 plus 34 plus 52, ROLL 7.1. PITCH 141.1. YAW 8.2. Maneuver to the attitude by 171 plus 24. Now the target is not the crater rim: the target has been displaced south eight nautical miles, so what we'd like you to do is estimate that, pick a point near that spot and track whatever point you pick. Now the gouge on 8 nautical miles is that its 3 lines on the COAS and the radius of the crater is 6-1/4 nautical miles. The camera settings remain the same.

SC You've got POO in ACCEPT on the computer, Houston.

CAPCOM Thank you.

END OF TAPE

SC Hey, Houston. I want to check on this
3 miquids business mileage difference over. Are you saying it's
8 nautical miles at acquisition and 3 miquids words on the COED?

CAPCOM 3 degrees, that is 3 marks offset.

SC Oh, oh, oh, okay, very good, I understand.

CAPCOM I have for you when you want to copy them,
the updates to your TEI 45 PAD and also a TEI 46 PAD. We
can do that any time, either before or after the photography
that you want.

SC Okay, we're ready to do that in about 2 seconds.

CAPCOM Roger.

SC Okay, go ahead.

CAPCOM Okay, do you want the whole TEI PAD over
again or just the changes. There will be 4 of them.

SC Why don't you just give us the changes.

CAPCOM Okay. This is the TEI 45 PAD. The first change
is NOUN 33, the correct one is 172271614, NOUN 81 is plus 30272
plus 03021 minus 00253. The DELTA V burn time box is 30423 210
30211 and the GET for .05 G is 244 plus 21 plus 56.

SC Okay, we need the DELTA VT, the burn time and
DELTA VC one more time.

CAPCOM Okay, DELTA VT is 30423 210 30211.

CAPCOM Apollo 12, the computer is yours. Thank you.

SC Roger, and Houston did you get that read back.

CAPCOM We didn't get your read back.

SC Roger. Do you read now?

CAPCOM Read you loud and clear.

SC Okay, first correction was NOUN 33, the second
column should read 1614, NOUN 81 DELTA VX is plus 30272,
DELTA VY is plus 03021, DELTA VC is minus 00253, DELTA VT is
30423, burn time remains 2 plus 10, DELTA VC is 30211 and
GET 05G is 2442156.

CAPCOM That is correct. Do you want the TEI 46 PAD?

SC Wait just a second.

CAPCOM Okay.

SC Okay, Houston, Apollo 12 ready to copy the ext
PAD.

CAPCOM Roger, this is the TEI 46 SPS G&N, NOUN 47 NA
NOUN 48 NA, time is 174271541, NOUN 81 plus is 30723 plus 03127
minus 01895, ROLL NA, PITCH 359, YAW NA, ullage is 4 jet 11 seconds.

SC Roger. Understand. (garble)

CAPCOM Apollo 12, break, break (garble)

SC Houston, Apollo 12. Sorry we were manuevering
then and lost you. How do you hear now?

CAPCOM Read you loud and clear, again. We lost you
just as you started your readback.

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 1710300, CST 1325 522/2

SC Okay. SPS G&N, and we go down to NOUN 33
plus 00174 plus 00027 plus 01541 plus 30723 plus 03127 minus
01895 NA 359, NA 4 jet ullage 11 seconds.
CAPCOM That's affirmative. I've also got a REV 46 map
update if you want it.
SC We don't need it.
CAPCOM Better give you your AOS time don't you think?
SC (garble)
CAPCOM Roger. AOS with TEI is 172 plus 40 plus 42
and without TEI is 172 plus 52 plus 00.
SC That's 172 40 42 and 172 52 00.
CAPCOM Roger. Just a question. We missed that one
readback attempt. Did you

END OF TAPE

APOLLO 12 MISSION COMMENTARY 13:35 CST GET 171:13:00 523/1

CAPCOM Roger. Just one question we missed that one
readback attempt, did you give us a readback on Lalande photog-
raphy stuff that we missed also?
SC I sure did. I'll read it back again, if
you'd like.
CAPCOM Okay.
SC How about 171 3052 171 3452, ROLL 7.1,
PITCH 141.1. YAW 8.2 be there by 171 plus 24.
CAPCOM We agree to all that, thanks very much.
SC Okay, you have your state vector and your target
load and the computers yours if -
SC Thank you, Houston. Roger.
PAO This is Apollo Control at 171 hours 14 minutes.
To recap the TEI, trans Earth Injection maneuver, time of
ignition 172 hours 27 minutes 16 seconds. This will be per-
formed while Yankee Clipper is behind the moon. Delta V
increase in velocity of 3042 feet per second. Duration of
the burn, 2 minutes 9.84 seconds. The - some of the entry
numbers, based on this TEI, and these numbers do not take
into account any midcourses, they are based strickly on the
TEI burn, 400 000 feet time would be 244 hours 21 minutes
27 seconds. Yankee Clipper would reach 05G at 244 hours
21 minutes 56 seconds. Splash predicted time 244 hours 35 min-
utes 21 seconds, based on this burn, the velocity entry inter-
face is projected to be 36 116.4 feet per second and this
TEI burn is targeted for an entry angle of minus 6.50 degrees.
Acquisition time with a successful TEI burn, 172 hours 40 min-
utes 42 seconds: acquisition time without a burn, 172 hours
52 minutes 00 seconds. We'll continue to stand by for any
air-to-ground. This is Mission Control, Houston at 171 hours
17 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 13:45CST GET 171:23:00 524/1

SC Houston, Apollo 12.
CAPCOM Go.
SC Pre TI - TEI systems check complete.
CAPCOM Very good.
CAPCOM Apollo 12, OMNI Alpha, please.
CAPCOM Apollo 12, would you verify OMNI Alpha?
CAPCOM Apollo 12, OMNI Alpha, please.
CAPCOM Apollo 12, Houston. Do you read?

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 171:38:00, CST 1400, 525/1

CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Roger. We just had a few minutes to
tell you that (garbled) say hello again.
SC Okay. Thank you. We're at a good
attitude now. We're doing a star check here shortly.
CAPCOM Roger.
SC Then we'll be giving you a P40.
CAPCOM Roger. Your star is going to be just
a little late coming into view for the moment. The flight
plan, it'll be in view at 171 57 08. (garbled).
SC Say the time again, please.
CAPCOM The time is 171 57 08, which is about
2 or 3 minutes after it's shown in the flight plan for the
star check.
PAO Twenty minutes of acquisition time
remains in this 45th lunar revolution. Dick Gordon reporting
that Yankee Clipper is in the proper attitude for TEI. Reporting
that shortly he will be going to program 40 on the command
module computer. That's the program for SPS thrusting, using
the big service propulsion system.
SC Hello, Houston. You're looking at P40.
CAPCOM Roger. Thank you.
PAO Two members of the backup crew for
Apollo 12 have joined Don Lind at the Cap Com console. They're
the Commander Dave Scott and the backup command module pilot
Al Worden. Deke Slayton, the director of Flight Crew Operations,
and Astronaut Tom Stafford, Chief of the Astronaut Office are
also at the console.
SC Houston, 12. The star check is okay.
CAPCOM Very good.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 11752 CST 1420 526/1

CAPCOM Apollo 12, Houston. We show about 2 minutes to LOS and everything is looking good to us down here.
SC Roger; see you on the other side.
CAPCOM Very good; we got a nice spot in the South Pacific already reserved for you.
SC Okay.
CAPCOM Apollo 12, we'll see you coming around the other side at 172:40 headed for home.
SC Roger; roger; bye bye. See you on the other side.
CAPCOM Have fun.
PAO And we've had LOS from Yankee Clipper. At 172 hours, 05 minutes, Commander Pete Conrad says, "Roger, roger; bye bye. See you on the other side." Transearth injection planned for 172 hours, 27 minutes, 16 seconds. With a good burn, we'll acquire a signal from Apollo 12 at 172 hours, 40 minutes, 42 seconds. It will probably be a few seconds after that when we get some voice. Without a burn, acquisition of signal 172:52 even. And we should have some television approximately 15 minutes after acquisition with the TEI burn, television planned about 172 hours, 55 minutes. This is Mission Control Houston at 172 hours, 7 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 14:49CST GET 172:27:00 527/1

PAO This is Apollo Control at 172 hours 27 minutes. We're 10 seconds away from ignition time for the Trans Earth Injection burn. MARK. The burn should be starting right now. Yankee Clipper is behind the moon where we cannot monitor the burn. We'll get a report on it when we acquire the spacecraft. Yankee Clipper's weight at loss of signal on this revolution with 34 163 pounds, should be considerably lighter the next time we see the spacecraft after this burn. Duration of this burn, 2 minutes 9.84 seconds, according to the clock we're 50 minutes and 50 seconds into this burn right now. Yankee Clipper's velocity just prior to the burn was 5 320 feet per second, to this will be added 3 042.3 feet per second. We'll come back up just prior to acquisition time. We're now 11 minutes and 50 seconds away from acquisition time given a good burn. This is Mission Control, Houston at 172 hours 28 minutes.

END OF TAPE

PAO This is Apollo Control at 172 hours 39 minutes. We're 1 minute 35 seconds away from the time we should receive Yankee Clipper's signal after transearth injection burn. We'll stand by live from now on. All of the TV lines are up and it is conceivable that the crew could have the TV on at the time that they come around the moon. It's not scheduled for that time, but we're prepared to take a TV picture should the camera be on. 30 seconds. 15, AOS. We've had acquisition of signal.

CAPCOM Apollo 12, Houston.

SC Hello Houston. Apollo 12's moving home.

CAPCOM Very good.

SC We've got a burn (garbled) burn time (garbled) 11, VGX was zero, VGY was 20 percent, (garbled)

CAPCOM Roger, 12, we got on time 2 plus 11, 0 plus .7 plus .1 minus 14.4 and will you say again. Your transmission was pretty weak on the end.

SC Roger, fuel was 7.4, oxidizer was 7.7, and the unbalance was plus 50.

CAPCOM Roger, 7.4, 7.7 and plus 50. Looks good.

CAPCOM Apollo 12, Houston. If you have a camera out already and plan some pictures coming back, we have a target of opportunity for you. However, if you don't have the camera out we don't want you to bother to dig one out.

SC We have a camera out.

CAPCOM Roger. They would be extremely happy if you could get some pictures of high lunar latitude so that we can get some small scale mapping. Procedure is as follows: At time 17(garbled) plus 05, we'd like you to use the Hasselblad with an 80-mm lens, black and white film, f/5.6, 250th and infinity and take pictures at high latitudes 3 frames about every 30 seconds.

CAPCOM To clarify, they want 3 frames together at 30 second intervals.

SC Roger. And give me the time again, would you please?

CAPCOM Well the times not critical. 173 plus 05 which is served during the last half of your TV pass but this is your option.

SC Okay. Even to the (garble).

PAO Yankee Clipper is 426 nautical miles away from the Moon now; velocity 7396 feet per second; weight 25 289 pounds.

CAPCOM Apollo 12, Houston. We're ready for TV any time you want to send some down to us.

SC Okay. We're trying to get it with this (garble) right now. The purple watch is a little bit

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 1500, GET 172:39 528/2

SC -later but we'll move the tab to
become a better picture.

CAPCOM We're ready anytime you want to send
it.

PAO We're standing by for a TV signal.
We have nothing yet. And the black and white picture coming
in.

CAPCOM We expect color any minute.

END OF TAPE

PAO - and the black and white picture coming in.
SC - we expect color any minute.
SC Okay, looks like we are climbing straight up from it.
CAPCOM Now, we've got a good picture in true living color.
SC Roger.
SC Let's change windows with it, Houston.
CAPCOM Roger. We really get the impression that you are on a fast elevator.
CAPCOM We see your view along the terminator although we don't see quite as much coverage as before. Here it comes in now.
CAPCOM 12, it really looks you are climbing out in burner.
SC Yes, we're really moving out, Don. It doesn't take very long to get some altitude out of that plane.
SC We've got you looking right at the terminator, now, of course, up towards the north.
SC Al's over busy getting blacks and whites. I'm at the 16 holding the TV monitor for Pete. We're all kind of busy letting you see all this.
CAPCOM It looks great.
SC One of the things you probably noticed on your TV screen is how rough it looks along the terminator line. And this was our impression the first time we passed over it. We said, this is the rocks part of it, and the next day with the terminator at 14 degrees, we saw that the part was now in higher sun looked fairly smooth, or at least like the rest as you see it and the part that was now in the terminator looked the roughest. I guess you get a real feel for the texture of the moon by looking near the terminator where you can see the height of the craters and the mountains and all the many features that are on the moon and more release.
CAPCOM Roger.
SC Can you point the camera up there toward the north? You can show them a couple of long rilles.
CAPCOM Roger. That texture really comes through loud and clear on your picture.
PAO That's a report from Al Bean.
SC The impression I get, Don, and I had it the first time I looked at the terminator, too, is that it is really useless for you all to have color out there because it is pure black and white and the way it looks to me right now where we are, it looks to me like a (garble) and that I am not looking at the original moon. It just

SC doesn't look right, it's so black and white.

SC It looks just like a black and white photograph, doesn't it?

CAPCOM Roger. We copy

SC Well, it's real enough to make me want to go into the direction I am going after 90 hours. (Garble).

PAO Altitude 902 miles.

SC Up at the upper top I see one rille up there. I don't know if you can see it on your TV camera. It's almost a straight line. It's about - I looked at the monitor and I can't see it on the monitor. About one-third of the way down from the top, they run horizontally across there. It looks almost like a straight line.

CAPCOM Roger. It's hard for us to see it on our screen down here.

PAO Altitude 940 miles, velocity 6576 feet per second.

CAPCOM Can you identify any of the features for us, 12?

SC Well, we'll bring out our little map. You know our map doesn't go to the higher latitudes, lower ones, but we'll see what we can find to point out to you that we know.

CAPCOM Roger.

PAO Altitude 1017 nautical miles.

SC Hey, Don, how long did you want us to keep up this photography of the high latitudes, three each 30 seconds.

CAPCOM Stand by.

CAPCOM You fellows got enough now. Anything you want to give us is fine, but don't push yourself. We're happy with what we've got now.

CAPCOM 12, it's really amazing how much the science of the moon has changed just in the few minutes you've been on the air so far.

SC I'm looking out our right on a small hatch window and I can see the moon is an entire sphere right now. We've really moved out.

CAPCOM We sure concur.

SC (Garble), yes, what's our altitude right now? What's our altitude rate? Can we know?

END OF TAPE

SC I'm trying to find out what's our altitude right now. What's our altitude rate? Am I go? Now, I think one of the things you can't see in your TV though is how the temperature in the burn changes the higher the sun angle, and how it is in the extreme westerly region there, you can see how light it is and how much more grey and dark it is by the terminator. We - as Al said sounded that way as the terminator moved across. It always looks that way.

CAPCOM Roger, I can see that very clearly down here.
SC Our abort system meter says that we're 109 miles right now.

CAPCOM Apollo 12, Houston. Right now you're getting close to 1100 nautical miles above the surface. You're coming up at about 4000 feet a second.

SC Okay. We're reading our DSKY wrong, we're showing 8098 miles. The area is sort of dark down in the lower corner of your screen is Smyth's Sea, and it's - it looks as you pass over the medium - the about medium size Mare that we see on the earth's side of the moon. The thing that's the most noticeable about it is the fact that there's many craters in it that are all filled up with the (garbled) material. You can just see the bare outline of the rim. They apparently were once very big like a lot of the craters you see over there near the terminator. Now they've filled up, and so they don't appear so. Now it's down in the bottom of your screen by that little white dot.

CAPCOM Roger, we see it very clearly. We assume that's the Sea of Fertility that's over on the west limb.

SC Oh, that's affirmative.

PAO Altitude 1230 nautical miles.

SC Apollo 12, Houston. We show that you're coming up at about 1 nautical mile a second. You're really moving out.

SC Okay.

PAO Inert.

SC We had talked about it on the back side of the moon just before the burn. We were then 3000 feet a second. We were going a little over 5000 feet a second around the moon, and we were talking about how it didn't seem like very much additional velocity to take you away from the moon and head you on back to earth, but I guess this low gravitational field here just allows you to not put in a lot to escape the sphere of influence pretty readily.

CAPCOM Right. Your velocity is dropping off at about 1 foot per second each second, so you needed all you put in.

SC Roger, that's a lot less than our velocity dropped off per second when we left earth. It, of course, was trying to pull us back much harder, and so we ended up slowing down to about 36,000 feet per second, much more rapidly. You could look at the computer and see that the velocity was

SC dropping many times that per second.

CAPCOM Roger, we were watching you down here.

SC Today while the picture taking was going on the three of us had the opportunity to discuss what we thought the texture of the surface was, especially because we were interested in our landing area and possibly finding some Copernicum ray materials looking at the rays and everything. And they are quite readily visible from 60 nautical miles, but if you'll look at them carefully through the binocular or something like that I think that the difference in texture is so slight when you get actually down on the surface that Al and I had the impression on the lunar surface and our landing site that we just could see no contact difference whatsoever anywhere we went, and I think that as you look at the moon going away you get that idea. You see high lights and whites and grays. You can see things like that. They're really not that much difference in color from one another.

CAPCOM Roger. What about the white and gray differences you saw around the west side of head crater. Could you see those out over the regional area?

SC Well, I kind of had the feeling that - Al and I talked about this that when we were in the right place and our foot tracks turned out the lighter material that it was still the same material. It's just that it hadn't weathered on the surface, and we had the feeling that the ray material is probably the same thing. It's pretty much the same general material, but it came at different times. It's had different exposure to the weather.

CAPCOM Roger.

SC Yeah, this is - there just didn't seem to be any difference in the colors at all. If you look at any part of the moon at the same time as any other part of the moon, as you started at the terminator and went around the moon it changed colors from gray to white and finally to brown. And we all sort of thought that was about what it was, and then the next day it did the same thing. The part that used to be more into the white, now it was the gray, because the shadows were over there more as the terminator moved in that direction. And we weren't able to see except in several spots any real large differences in colors.

SC I'll tell you, Pete, could you show them that large crater down there in the lower left hand?

PAO That was Al Bean.

SC (garbled)

SC No, it's way over here on the opposite side of the terminator. There's Pico. Can you show them that one? The one with the cracks and several craters in the middle. That's a beautiful crater.

CAPCOM To give us some idea of the color, how would you -

SC Take the TV and I'll show it.

CAPCOM How would you describe the color of Smyth's Sea and the Sea of Tranquility for us so we'll know how accurate our TV color is.

SC It just seems a chalky gray to us.

CAPCOM Like Portland cement?

SC Pretty much. That's good as anything else.

SC We don't know whether it's wet or dry.

SC Dark, mare material. Some of it looks wet. Would you believe that?

SC As a matter of fact that's probably not too bad a description. If you just threw some Portland cement down and threw water on it varying amounts would be a little more moist than others. I guess the same might be down on the earth.

SC The wet part of course would be the darker Mare material in there, and it is lightened considerably by rills and craters and objects that are taking place there, this giving it a lighter temperature, but basically remaining the same material.

CAPCOM Hey, listen, tell us about all those grooves and ridges you saw on the surface. Could you get any patterns out of those? Could you see those from orbit?

SC Let me see.

CAPCOM Hey, 12, is that the subsolar parts that -

SC While down there, once we saw - -

END OF TAPE

CAPCOM Hey, 12, is that the subsolar po -
SC Don, the ones we saw
SC Sorry I cut you off -
SC (garbled) impact crater, yeh. Also the sea
just to the south of that great impact crater is the one that
in the middle of it are two craters, one crater has a single
ray that runs horizontally all the way through it and the
other crater has a single that just runs out one side of it.
Very odd set of ray patterns there.

CAPCOM Roger.
SC Say, Don you were asking about those (garbled)
We don't - the ones we saw on the ground were very very small.
Maybe an eighth of an inch. But there are definite patterns
on the Moon. I'm going to show you up at high latitudes
right now.

SC Let's see the monitor Pete, so I can see if
I'm pointing to the right place. Now I think you'll be able
to see some lines that's either (garbled) from the Pole all
the way down towards the center of the Moon.

SC Towards the equator. Let's see if I can get
over to the right place.

SC Are you able to see that, Don? It seems to
emanate right from the Pole region right where the terminator
strikes the Pole and they seem to come down towards the mare
area. They seem to run in parallel lines from that point on
down.

CAPCOM Roger, they just barely show up on our screen.
SC Did you get a look at the crater Tycho that
should be interesting because it's large and has a lot of
rays. And it also has - although the rays at this particular
shot angle aren't so visible. You can see it. It's large
one of the larger craters down in the southern part of the
Moon. (garbled) it's one of the most visible from our -

CAPCOM Roger, we didn't know whether that was Tycho
or whether that was a subsolar point.

SC No that's Tycho.
SC And also that crater just to the north of it,
which I don't know the name of, is also a very bright crater.
It appears very white in our little monitor up here.

CAPCOM Roger, we see it very clearly down here too.
SC Hey, let's move it to that hatch window. It's
a better window Pete.

PAO Altitude 1699 nautical miles. Velocity 5868
feet per second.

SC High gain looks okay. Stop there, you got it
now.

CAPCOM That's a very impressive picture.
SC Okay, I've got the monitor Pete.
SC Okay, Dick, just a little bit higher.

SC - so that we could - I can't hold it any higher (garbled)

SC Okay.

SC I just maneuvered it so that I can see the whole Moon and that's it now. We have the whole Moon in it now.

CAPCOM We've got a good picture of that. You know the most amazing thing is that you were just in orbit down there a few minutes ago.

SC (garbled)

CAPCOM I'm sure that's true.

SC I'll get that sort of detached feeling, detached from the Moon.

SC Can they see it as a whole sphere now, Pete.

SC You're giving us just a little bit of the south.

SC Yeh, it's in the - I just can't move the camera there in the window.

CAPCOM No, you're doing a great job.

SC Well I keep the camera up and down the same way all the time.

SC That's about the most I can get in right now. But it is - we're going so fast though that I think that it'll all show up in there in a minute.

CAPCOM Ooh, that's beautiful. We can see all the way across to the western rim and the north terminator is about half way down to the south.

SC Say, are we coming out in the Earth-Moon plane here or are we going over the top or what? We were just discussing this and wondering, it's not - you know it's not obvious that we (garbled) what we're doing. It's my guess to say that we'd be coming out right along these (garbled) What are we actually doing?

CAPCOM We'll get it for you just a second.

PAO Altitude 1865 nautical miles, velocity 5765 feet per second.

CAPCOM Hey, listen, while we're getting that since you're the international experts on lunar rock throwing, how does that work. Tell us what a rock looks like when it rolls down a lunar crater since you did some of that on Earth.

SC Well, it goes very slowly. And I guess the impression you have is the same one you have as if you throw something up there and we had the occasion to throw things away, they sort of move out, not too rapidly but they just keep going and that's exactly what happens when you roll a rock down the side of a crater. It was hard to get them going, I was surprised. I think everybody had the idea up there that because you're in such light gravity, that things would roll down rather easily. And that really wasn't the case. Once

SC you got it going, it just sort of went along in animated slow motion but it kept going for a long long time.

CAPCOM Did they bounce or did they dig in and did they go through this bounce slide?

SC Well, they bounce and slide, a little bit of everything just the way they do on Earth but just stretch it out. I was - I found that I couldn't walk, wherever we went we loped and it just didn't seem natural not to lope. And but when you lope, it reminded me of these pictures, high speed motion pictures of watching a greyhound run or something like that. That's the feeling I had as I loped across cause I'd have to step out and desert a hold that I had until I came down. And that's the way Al and I moved around on the whole traverse.

CAPCOM Sounds like you were having a ball.

SC Dick, if you could pitch down the little board, it help Pete a lot.

SC Well, Al accused me of usually making him carry all the tools.

SC One time he said that he had wound up with all the ones that I had too and I was just running there in front of him. He's probably right now that I think about it.

SC You know the funny thing about moving around on the lunar surface, you put on this pressurized suit we wear and if you try to do it on Earth, with even close to the weight you have on your back on the Moon and you get tired very rapidly from the walking and you don't have to walk over, let's say 2 or 3 hundred yards and you're ready for a rest. But on the Moon in the light gravity with the same suit on and the same weight, your legs never seem to get tired. I guess when you run up the side of a steep slope you could but just running around on level ground, you assume some kind of normal pace and you're able to go for long distances without your legs getting tired. The suit doesn't always want to bend like you want to bend. For example, you can bend pretty well at your knee and it bends pretty well at the ankles but it doesn't want to bend up near the thigh, the top of the thigh. So what happens is you tend to run with straight legs, land flat footed and then push off on your toes. And you think to yourself well I'm going to tire out my gas pretty soon because I'm not used to this sort of thing but apparently the force it takes to push off on your toes on the Moon is much less than you just have when you walk around on Earth so your legs don't seem to tire. You can move around rather easily, don't you think, Pete.

SC Yeh, I'd just like to ask the doctors, I haven't any idea but I'm sure that our heart rate stayed fairly low even when we were loping. I don't think we approached any where near the heart rates that we had in just our normal

SC walk throughs and practices in just the one g back on Earth and I agree with Al you could go for 8 or 9 hours -

S/C - back in earth. I agree with Al, you could go 8 or 9 hours out there before (garble). The other thing that we did was (garble) worry about falling over and going down slopes and things. I fell over once up there but I didn't have any problem getting up and we just finally to expedite things - we would just fall over on our face picking up the rock and give ourselves a one-hand pushup or just get down on our knees and get with it get whatever it was we needed to pick up down there. We picked up any rocks that were bigger than the tongs would pick up.

CAPCOM Roger. Your heart rates were just about as expected and the report is that you are just about in the earth/moon plane, just a very small bit out of the earth/moon plane but you are almost coming straight home. Also, we are about to lose one of the satellites that is bringing this TV back to the states, so we are probably going to have to bid you good bye here pretty soon.

S/C Okay. Why dont we just slip inside for a second and say hello to everybody and then you can shut her off.

CAPCOM Very good.

S/C (Garble) Okay, that is a good idea. The way we were hunting this (garble) or just stand as we moved the camera inside the spacecraft. One of the fun things about this zero g living is when you spend a day or two here you have lots of items that you keep around - pencils, cameras, and scissors to open your food. Do you? Do you need more light?

CAPCOM Roger. Are you on your inside switch?

S/C We have got it open. Over. Yeah. How's this do for you?

CAPCOM You are coming in better.

S/C How does that do?

CAPCOM Pretty good.

S/C Okay. Let's see what switch you have got in focus.

CAPCOM Your are looking good now.

S/C Okay. That is a good idea. Is this better?

CAPCOM That's affirmative.

S/C That ought to do it. When you end up like - I don't know if you can see this camera that I have got on GD - the one that I am taking pictures of the moon with but they float around just like you see. The funny part is - the funny part is when you are not watching them, they will float off, and then you will hunt for them but the problem is all your training all of your life has been to

S/C hunt for on top of things - like on top of the seat, on top of the floor, or somewhere else. You walk around the spacecraft hunting for it but really they may be in plain view just resting right on the underside of the seat, or maybe just up there near the top of the strut and you have one whale of a time finding these objects. You look all around and then somebody on the other side will say "look, it is just by your right ear." It really becomes sort of a lot of fun when one of these gets lost and you spend a few minutes hunting around and usually end up right in plain view but you just don't look there from all these habits you built up over the years.

CAPCOM Hey now, we see Dick.

S/C Hey Don, I understand you have changed your schedule quite a bit since we left last Friday and we are very sorry about that but that can't be helped either.

CAPCOM No problem.

S/C We did all our work I understand real early in the morning or very late at night down there and we understand very late the first night up - about 20 hour day to adjust out schedule to the activities around the moon and we sure enjoyed it and hope that everybody there has enjoyed having us bring what we can to them. We were particularly disappointed that we weren't able to get - yeah, we were particularly disappointed that we were not able to give you the lunar surface TV. It just didn't seem to work out. I guess that maybe the next time - The Apollo 13 will give you a chance to look at what's going on down there. It is going to be a lot of fun.

CAPCOM Everyone was absolutely delighted at the tremendous job you did. What happened to Pete. We haven't seen him yet.

S/C He is going to come into view. I have been hiding in my favorite spot - the top of the tunnel. We have all our gear stowed in here by the way. Why don't you show them some of the gear we have stowed; Surveyor bag particularly because that is unusual and we have it stowed in a pretty slick place.

S/C I don't know if they can see all of that but we do - we have the rock boxes put to bed and all the surveyor gear. I guess one of the big thrills, of course, for Al and I was to sit down next to the surveyor and especially when we stepped outside and look out around the back of the spacecraft. Yeah, that was a thrill. But sitting right there on the other side of the crater, I also gave myself quite a thrill. I think you will appreciate it when you see the pictures and you see how close we landed to the crater - which I didn't notice at the time because it was behind me, but I

S/C didn't want to overslide too far but I guess I parked it pretty close to the edge of the crater and we are also very impressed that the tracking and everything put us right down in the middle. Everybody at home seems to have done their homework there. We didn't have to do anything but land it. And Dick surprised me I think, by finding us, not only finding us in the sextant, but also the surveyor and the LM in the sextant. He also took some pictures through the sextant with a 16 mm camera that they had on the next REV and hopefully we will have movies of the LM and the surveyor on the ground that are discernable in the movies. I don't know if that will work or not. We will have to wait until we see the film.

CAPCOM Very good. We will be looking for them.

S/C We have enjoyed the trip. We have enjoyed the trip. Everybody adapted to zero g very well. We enjoyed whistling in and out of the LM and after having flown 8 days in Gemini, it is a real pleasure riding around in this one. Being able to move around and have all the good food and hot water and shave and all those good things we could do. We have kept the ship pretty spick and span and we do have things all neatly stowed. I don't know if you can show them, Dick, why don't you show them the surveyor bag - No, they can't see it. Well, with that I think we'll sign off and we will see you in about 3 days.

CAPCOM Thank a million all three of you. You did a four-0 job and your families and the whole team are waiting for you back down here on the ground.

CAPCOM Apollo 12, Houston.

S/C Go ahead, Ed.

CAPCOM If you will give us POO and ACCEPT, we will give you a PTC REFSMATT and for the PTC we want to use quads alpha and delta.

S/C Hey, we are going to stay at this attitude if you can (garble)

S/C Okay. You got it. POO and ACCEPT.

CAPCOM Thank you.

PAO PTC is passive thermal control.

S/C This moon is just a white ball right out in the middle of a big black void and it doesn't seem like either. We are separating from one another but there just doesn't seem to be any rhyme or reason why we are or why it is setting out there. All the time we are in lunar orbit we were discussing this thing - how unreal it looked. It is amazing to us to fly around it as it is when you just think about going to the moon. It is very, very, unreal to be there.

APOLLO 12 MISSION COMMENTARY, 11/21/69 15:40 PM CST, GET 173:19:00 532.

CAPCOM You know, your pictures were absolutely
fantastic showing how fast you moved away from the moon. You
really gave us a good picture of that.

S/C We're still doing it - it is really getting
small to earth. It's is just sorta unreal to look outside. It
is almost like a photograph moving away from you. It doesn't
seem possible it can be a whole sphere that you were orbiting
a couple of hours ago.

CAPCOM Well, when you first gave us a picture, you
looked like you were very close to your orbital altitude, but by
the time the picture went inside it looked about like a basketball
out at arm's length.

S/C That is pretty good - because right now
at arm's length it looks about like 6 inches.

CAPCOM Tremendous

END OF TAPE

PAO Yankee Clipper is 2551 nautical miles away from the moon now. Velocity 5403 feet per second.

SC Hey Don. Do they have any hack on the midcourse yet?

CAPCOM Yes. It's extremely small, something like a third or a quarter - third or half foot per second.

SC Yeah. That's great. That's great.

CAPCOM It was a very excellent burn. It's going to be a real small one.

SC I'll tell you this SPS engine is a real wonder. It really gets out and goes, and really performs well at that. It's really a smooth ride.

CAPCOM We copy.

PAO During the TV transmission you heard Don Lind pass up a figure of 4000 feet per second. That was not Apollo 12's inertial velocity. That was the range rate at which Apollo 12 was going away from the Moon.

SC Go.

CAPCOM Listen. Once you guys get bedded down, we're not going to awaken you in the morning. So whenever you get up and want to start a new day, you give us a call. You've earned a good long night's sleep. So sleep in as long as you want.

SC Okay. No problem.

SC You have no idea.

SC I think I gained weight on this trip. He's accused me of being a chow hound.

CAPCOM How come you're not getting out and doing your mile a day?

SC He does it running from his couch to the food compartment.

CAPCOM Laughter.

SC That's Conrad now.

SC Al Bean is discouraging everybody from running these days.

SC Yeah. That's right.

SC How's our new training schedule? You're going to become the Training Officer.

CAPCOM Roger. The computers yours. We've finished sending up your REFSMAT.

SC Okay. Thank you. How long can we - When do you want us to start PTC?

CAPCOM Anytime you want.

SC Okay. We'd like to watch it for awhile.

CAPCOM Let's hold off for it in the middle of a playback data. So, give us some time on that.

APOLLO 12 MISSION COMMENTARY 11/21/69, CST 1550, GET 173:29 533/2

PAO At 173 hours 32 minutes, Apollo 12's distance from the moon 2761 nautical miles, velocity 5321 feet per second.

PAO As we were explaining earlier, that 4000 feet per second that we passed up was the range rate in the vector directly away from the Moon. It did not have several other components of velocity in it. It was only in the vector directly away from the Moon.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Roger. We finished dumping the data so you can start PTC anytime you want to after you finish 52.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, GET 17339, CST 1600 534/1

PAO This is Apollo Control at 173 hours, 40 minutes. Yankee Clipper's distance from the moon now 3139 nautical miles, velocity 5185 feet per second. Apollo 12 in the process of realigning it's inertial platform at the present time. At 4:30 p.m. central standard time, there will be a briefing in the briefing room at the Houston News Center by the Apollo Spacecraft Program Manager, Jim McDivitt and by the Chief of the Test Division of the Program Office, Don Arabian, concerning the completed analysis of the electrical phenomena associated with the launch of Apollo 12. That's at 4:30 p.m. central standard time in the briefing room at the Houston News Center. That briefing will be carried on this release line. The crew should have entered into their sleep period at that time. We'll continue to stay up and monitor until the crew does bed down and this is Apollo Control, Houston, at 173 hours, 41 minutes.

PAO At 173 hours, 50 minutes, Yankee Clipper's distance from the moon 3606 nautical miles, velocity 5044 feet per second.

SC (Garble)

CAPCOM GO, 12

SC Roger. We just wanted to give you the torquing angles on the DSKY.

CAPCOM Roger. We got them. Thank you.

SC Houston, you're ready for an E-memory dump?

CAPCOM Give us just a moment.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 16:20, GET 173:59 535/1

CAPCOM Apollo 12, Houston. We're ready for
that E-memory dump now.

SC Okay.

CAPCOM Apollo 12. We've got a good E-memory
dump. Thank you very much.

SC You're welcome.

SC Thanks for the good T30 pad.

CAPCOM Yes sir.

PAO This is Apollo Control at 174 hours
5 minutes. Apollo 12 is 4295 nautical miles away from the
Moon heading towards home at a velocity of 4876 feet per
second. The briefing in the Houston News Center on the
analysis of the electrical phenomenon during launch of
Apollo 12. It is about to begin. We'll take down this
release line during the briefing, tape any air to ground
transmissions and play those following the briefing.
At 174 hours, 6 minutes this is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control at 175 hours, 15 minutes. Apollo 12 is 7392 nautical miles from the Moon. Velocity 4443 feet per second. The crew has not yet turned in. They're now establishing the passive thermal control mode for the sleep period. We have about 6 minutes of tape accumulated during the News Conference. We'll play that for you now.

SC Houston Apollo 12. What QUADS did you want disabled for the PTC?

CAPCOM Disable Baker and Charlie. We want you to use ALPHA and DELTA.

SC Roger. I guess we're (garble) in PTC attitude. Are you going to want us to go off the high gain and use the OMNIs tonight because of the performance of the high gain?

CAPCOM That's affirmative.

CAPCOM Apollo 12. When you go off the high gain we'd like you to turn off the high gain power during the sleep period and pick up with OMNI BRAVO.

SC It - we'll do.

CAPCOM Also we'd like you to turn off the optics power this evening for the sleep period.

SC You want us to turn off the optics? (garble) data.

CAPCOM That is affirmative.

SC In OFF. Let me ask you again Houston. Said again those two QUADS? That you want disabled.

CAPCOM BRAVO and Charlie, OFF; ALPHA and DELTA to be used.

SC Okay.

CAPCOM Apollo 12, Houston.

SC Okay, Houston.

CAPCOM Roger. I checked with your wives' and I had a short status report on the family whenever you get a minute.

SC Outstanding. Let's hear.

CAPCOM Okay, Pete. I talked to Jane and she said she really enjoyed the TV show. Also she sent a letter out.

SC Hold on just a second - Hold on just a second.

CAPCOM Got you.

SC He'll be on in just a second.

SC Go ahead.

CAPCOM Okay Pete. I talked to Jane and she said she saw the TV show and enjoyed it (garble). That it was a great show. Also she sent a letter for you out

CAPCOM -to the carrier that will be there with all the family news when you arrive. But she wants you to know that all the family is well and they're anxious for you to hurry home. Dick - Barbara -

SC Very good.

CAPCOM Said that they also saw the show and they thought it was great and the family's in she said again great shape so they're looking for you back in a hurry. And Al, I talked to Sue.

SC Okay Don, thank you.

CAPCOM You bet. Al, I talked to Sue and it seems that when the network put on the TV show they had Pete's name up under your picture and she said it's been so long since she has seen you that it even confused her for a moment. But the family's been watching the flight. They're waiting for you and they're looking forward to splashdown and everybodys fine.

SC Thank you for checking Don.

CAPCOM You might wear a name tag or something so that she'll recognize you.

SC There won't be any worry about it for another 20 days or so.

CAPCOM Roger.

SC And (garble) last in the LRL for awhile.

SC We're just finishing up our meal now Don and we'll be coming at you with the pre sleep report in about, I don't know, 10 - 15 minutes.

CAPCOM Fine. We'll be down here.

SC I hope so.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston. You're extremely weak, Pete.

CAPCOM Roger. Your rates look good so you can go ahead and set up any time you want and we assume that you have no dumps to do - before start of the roll.

SC Roger.

CAPCOM Pete. Would you ask one of the other crew to transmit. We can just barely read you. Still extremely weak, Al. You're just barely audible.

CAPCOM Roger. The problem is probably between the site and Houston, there's a dialing signal, so we'll check it out here on the ground. Thank you.

CAPCOM 12. We copied just a little dumping going on. As soon as that dumps out, you can go ahead and roll.

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 1751 GET 175:15 536/3

MSFN Goddard Voice Houston contact Net 1.
CAPCOM Well, it appears that we've lost the
downlink longline for a few minutes. As soon as we get
it reestablished, we'll be back with you.
SC Houston, 12.
CAPCOM Roger. That one came down loud and
clear.
SC Okay. You tell me you don't want
us to dump any urine. Is that correct?
CAPCOM No. We're saying the damp out your
rates for a few more minutes and then start your roll.
SC Okay. But you don't want us to
dump urine after we start PTC. Is that right?
CAPCOM Whatever's necessary, go ahead and
do. Damp out your rates as much as you can before you start
to roll.
SC Okay.
CAPCOM We just don't want to have to wake
you up in the middle of the night and do a maneuver for
us.
SC It's no problem. We can keep it
on board. So I didn't know when we're down this late if
it was going to mess us up and I guess it probably will
so we'll go ahead and keep it on board. There's no problem.
CAPCOM Roger.
CAPCOM Apollo 12, Houston. Your rates were
just asked. If you want to spin up, we're agreeable.
SC Okay. We were just getting ready to
do that now. Thank you.
CAPCOM Roger.
SC Houston, 12.
CAPCOM Go ahead 12.
SC Al's turned that one up so I'm going
to start over again.
CAPCOM Roger.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Roger. We're going to be on low bit
rate most of the night so we won't be getting any biomed
data from you, so if you want to disconnect your harnesses,
that's fine with us.
SC Okay. Very good.
SC Okay. Let me give you the checklist
here. The crew status report, the Commander had one
decongestant, the CMP had nothing, the LMP had one sleeping
pill last night and one decongestant. The fans been cycled.

SC the waters been chlorinated. We've verified the valves batt C at 37.0 cryo batt A 87 percent 1 cryo batt B 37 l. You've got the E-memory dump and as soon as I get the PTC going here we're going to hit the pad actually. The LMP's (garble).

CAPCOM Very good. Have a good night. You've certainly earned your rest.

SC Thank you.

CAPCOM We'll see you in the morning.

SC And how does the rates look to you down there?

CAPCOM Looks fine. Set her up.

SC Okay.

PAO This is Apollo Control at 175 hours 26 minutes. That's the end of the tape. We signed off with the crew at an elapsed time of 175 hours 20 minutes. We do not plan to call them from the ground. We're going to let them sleep until they call us. We won't put in a wake up call to them in the morning. Let them sleep as long as they like. An early look at the data from the TEI burn by the Flight Dynamics Officer William Boone shows the burn on time. The DELTA V achieved of 3042.4 feet per second against a predicted 3042.3 feet per second. Based on that he has not changed the entry interface velocity numbers. They remain at 36 116.4 feet per second. An early look at the entry angle shows it to be minus 6.69 degrees against a targeted minus 6.650 degrees. This will continue to be refined through tracking. We haven't had too much tracking since the burn not as much as the Flight Dynamics Officers like to look at. But based on this preliminary look, midcourse correction 5 would be only 1/2 foot per second or less. We also have the latest status report on the lunar surface experiment package, in particular, the cold cathode ion gauge. The cold cathode ion gauge performed well when first activated but its high voltage power supply turned itself off around 4:00 AM Central Standard Time on November 20th. This shut off is probably due to arcing. The instrument can be reactivated but turns itself off after a few seconds, indicating no permanent damage. Outgassing of the electronics is the suspected cause of arcing. To solve this problem, the gauge has been placed in a standby mode and further operation is not planned until residual gasses have been baked out. This is expected to take from one to two weeks. Arcing is a common problem in high voltage circuits including home television sets. Electrical current jumps from one point to another across an air gap accompanied by crackling noises and a visible flash. Small traces of gas

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 1751, GET 175:15 536/5

PAO are more likely to sustain the current flow than either a normal atmosphere or a high vacuum. In the cold cathode ion gauge the combination of high vacuum and moderate temperatures is conducive to release of gas molecules contained in non-metallic materials such as potting compounds. Until the gas is dissipated, it permits arcing to occur. The overload resulting from current flow in the arc activates a safety circuit shutting off the device. The condition has been encountered in vacuum chamber tests but was avoided by presoaking the equipment in a vacuum for a few days before applying operational power. Flight to the moon had been expected to provide adequate soaking time. Apollo 12 is 8013 nautical miles from the moon; velocity 4389. The crew has turned in for the night. And at 175 hours, 30 minutes this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 CST 18:42 GET 176:20 537/1

PAO This is Apollo Control at 176 hours 20 minutes. We've had no further conversations with Apollo 12 since Don Lind the CAPCOM said good night to them an hour ago. At present Apollo 12 is 10 111 nautical miles from the Moon. It's velocity, 4250 feet per second. All systems that we are monitoring here during this sleep period continuing to function normally. We do not have the biomedical instrumentation on and of the crew for this sleep period. This is Mission Control Houston, at 176 hours 21 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 CST 19:47 GET 177:25 538/1

PAO This is Apollo Control at 177 hours 25 minutes. Apollo 12 now 12 759 nautical miles from the Moon. Speeding home at a velocity of 4132 feet per second. We still have had no conversation with the crew since the elapsed time 175 hours 20 minutes when we said good night to them. We're continuing to monitor systems by telemetry, performance is normal. At 177 hours 26 minutes, this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69, CST 20:11, GET 177:49:00 539/1

PAO This is Apollo Control at 177 hours, 49 minutes. The change of shift news conference in the Houston News Center will begin at 8:30 pm Central Standard Time, 8:30 pm. Jerry Griffin and the gold team is being relieved now by Flight Director, Clifford Charlesworth and the green team. Capcom coming on shift now is Paul Weitz. Apollo 12's distance from the moon at present is 13 732 miles, velocity is 4 098 feet per second. This is Mission Control, Houston at 177 hours, 49 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69, CST 2144, GET 179:22 540/1

PAO This is Apollo Control at 179 hours, 22 minutes ground elapsed time. Some 64 hours, 59 minutes until entry. Apollo 12 crew still asleep at this time. Now some 17 405 nautical miles out from the Moon traveling at a velocity of 4003 feet per second relative to the Moon. The spacecraft weight 25 175 pounds. The crew, according to the flight plan scheduled to be awakened at 2:30 in the morning, Central Time. However, it's planned to let them sleep as long as they want to and they in turn will make the first call back to Mission Control. At 179 hours 23 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/21/69 CST 23:30 GET 181:08 541/1

PAO This is Apollo Control, 181 hours 8 minutes ground elapsed time. Apollo 12 spacecraft homeward bound some 21 524 nautical miles out from the moon, velocity 3933 feet per second. Countdown clocked to entry interface are 400 000 feet above the surface of the Earth now showing 63 hours 12 minutes until entry. Crew still asleep at this time. It's a situation where don't call us, we'll call you. The crew will sleep longer than the scheduled time in the flight plan. And at 181 hours 8 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, CST 0043, GET 182/21 542/1

PAO This is Apollo Control 182 hours, 21 minutes ground elapse time. 61 hours, 59 minutes until entry interface, Monday afternoon. Distance now from the Moon of Apollo 12, 24 356 nautical miles. Velocity reference to the Moon 3899 feet per second. The crew is still asleep at this time. And at 182 hours, 22 minutes ground elapse time, this is Apollo Control.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/22/69, CST 01:52, GET 183:30 543/1

PAO This is Apollo Control 183 hours 30 minutes ground elapsed time, 60 hours 51 minutes until entering interface. Crew of Apollo 12, still asleep at this time. Spacecraft Apollo 12 meanwhile is now 26984 nautical miles out from the moon on the return leg home. Velocity relative to the moon 3874 feet per second. Some other numbers for those who like to dabble in statistics, Apollo 12 will cross over from the moon's sphere of influence to the earth's sphere of influence at a ground elapsed time of 186 hours 30 minutes 43 seconds. The equal distance point half way between the moon and earth will come at 219 hours 47 minutes and 40 seconds. Distance at that time will be 110904 nautical miles. The point of equal velocity between earth and the moon, that is when the spacecraft velocity relative to both bodies is equal will come at 207 hours 14 minutes 14 seconds. The velocity at that time will be 3919.5 feet per second. The mid-point or half way back between TEI, transearth injection and entry will come at a ground elapsed time of 208 hours 23 minutes 41 seconds, at which time the spacecraft will be 139992 nautical miles out from earth. Velocity relative to the earth 3991 feet per second and the moon figures at this half way point, 83322 nautical miles out from the moon. Velocity 3944 feet per second. At 183 hours 32 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control Houston at 187 hours and 10 minutes now into the flight of Apollo 12. We have still had no contact with the Apollo 12 crew, apparently continuing in their cycle of rest. However in Mission Control Center we've worked up - the retro fire officer down in the front row has worked up at least a tentative pad for mid-course correction number 5. Assuming this pad is enacted, we would have the ignition of MCC 5 at ground elapsed time of 188 hours 27 minutes 14 seconds, with a Delta V of 2.2 feet per second. It's effect would be to modestly shallow out the trajectory on it's present course, Apollo 12 would be looking at an entry angle of minus 7.95 degrees. The effect of this slight burn would be to bring the entry angle down to minus 6.5 degrees. Also it would have an effect of slowing our arrival time at entry enterfaze to about 1 minute on it's present course. Apollo 12 would arrive at entry enterfaze at 244 hours 21 minutes and 4 seconds with this slight alteration. The GET time should be 244 hours 22 minutes 5 seconds. We will stand by and continue to monitor, we presently show a ground elapsed time into the mission of 187 hours 12 minutes, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 187 hours and 25 minutes now into the flight. Apollo 12 presently traveling at a velocity of 3000.43 feet per second. Its present altitude above Earth 181 838.7 nautical miles. Looking at our displays in Mission Control Center, there is some indication that the crew may be awake now. There's been some activity reported on their display keyboard for the guidance computer and we would expect their Capsule Communicator, Ed Gibson, will be in touch with Apollo 12 before too very long. We're at 187 hours, 26 minutes into the flight and continuing to monitor.

CAPCOM Good morning, 12. Welcome back to transearth coast.

SC Good morning, Houston. How are you?

CAPCOM Very good. How are you folks?

SC Fine. We'd like to say we really sacked out last night, I guess.

CAPCOM That you did. You had to, Paul Weitz was on.

SC Laughing - very good.

CAPCOM Say Pete, right now -

SC What's new in the world news today?

CAPCOM Okay, why don't we first figure out how you want to go from here. We could take a - and pick up midcourse 5 which is relatively small - a little over 2 feet per second and 18827 or we could slip it a little bit it's maybe up to on the hour even. It's really up to you folks.

SC 18827, huh.

CAPCOM That's right. It depends upon how far you are along in your post-sleep activities. It can be slipped just as easily.

SC Okay. What - why not - why don't we go ahead and burn it on time. I tell you what, the only thing we have to do is change the canister and we all had 12 hours sleep last night, I think. I lost track of time there and the PRD's are 11026, 11025 and 04027 and we'll go ahead and do a quick P52 here for you in PTC orientation and then give you the confusor, okay. And you can uplink loads. That what you want to do?

CAPCOM Okay, that sounds good.

SC And in the meantime we'll go ahead and put on - wait - do you want us to try and get the H2 purge done and waste water dump before and fuel cells before we do start?

CAPCOM Yeah, let's go ahead and try to carry things out in the same order in which you would have done them before. That is, all flight plan items proceeding your midcourse 5 was still required and accomplish it at your own accrued determined pace. Your water dump and fuel cell

APOLLO 12 MISSION COMMENTARY, 11/22/69, CST 0537, GET 187:15 547/2

CAPCOM purges after your sextant star check.
SC Okay. Very good. We'll go ahead and do the consistent few right now.
CAPCOM Okay. And one word on after MCC 5 and your associated data dump, you'll roll the spacecraft 180 degrees and hold attitude rather than PTC for the next 1 1/2 hours -

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 06:07 GET 187:45 548/1

CAPCOM - for the next 1 and 1/2 hours, and then you want P23 nominally scheduled for 189.
SC Okay. P23 for 189.
SC What rolling degrees did you want?
CAPCOM Okay. You'd be rolling 180 degrees from the attitude that you'd have in MCC 5.
SC Okay. Very good.
CAPCOM We have a consumables pad for you here, and we'll be coming up with a maneuver pad shortly.
PAO This is Apollo Control, Houston at 187 hours, and 48 minutes into the flight. That was Pete Conrad talking to Capcom, Ed Gibson, and as you heard we commenced with our wake up music about 5 minutes ago. And it became a bit of a battle of the bands as the crew played back music to the ground from their onboard recorder. We presently show Apollo 12 traveling at a speed of 3 013.5 feet per second and at a distance from Earth of 181 157.7 nautical miles. This is Apollo Control, Houston.
CAPCOM Apollo 12, OMNI Charlie. OMNI Charlie.
CAPCOM Apollo 12, Houston.
SC Okay. Here's the alinement for you. It was done on 645, star angle distance were Balls 1 plus 0023 minus 00301 plus 00211, 1875445. And the computer is yours.
CAPCOM Roger, Pete. You can go ahead and cut off the CRYO Fans.
SC Okay.
CAPCOM And we have a maneuver pad and consumables update in that order when your ready to copy.
SC Okay. Give me the consumables update first.
CAPCOM Okay. GET 187:30. RCS total 34. And Alpha through Delta 35, 32, 34, 34. H2, 34.5 and 34.5. 02, 37.3 and 40.2.
SC Okay. I copied all that. We're ready for the maneuver pad.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 06:19 GET 187:57 549/1

SC Okay, I copied all that and we're ready for the maneuvering pad.

CAPCOM MCC5 RCS G&N 25138. Your trims are NA. GET 188 27 13 74 plus 00020 and Delta VY and Delta VZ are zero. 089 339 007. Noun 44 NA 00020 005 00020 22 3230.

SC Hold on a second.

CAPCOM Roger.

SC To check it. I understand now. The Delta VT is in the 000 20. Start from there.

CAPCOM Okay. First, the Noun 44 was NA. Delta VT was 000 20 005 00020 and that was Delta VC. 223230 359. Foresight star 016 up 072 left 42. Noun 61 minus 1581 minus 16514 11711 36198 244 22 34. Under comments, your stars, Sirius and Riger. Alignments, 256 152 069. Your ullage is 4 jet RCS plus X.

SC Okay, RCS G&N 25138 NA NA 188 27 1374 plus 00020 the next two are zip NA and roll is 089 339 007. NA NA 00020 005 00020 223230 359 016 up 072 left 42 minus 1581 minus 16518 11711 36198 244 22 34, Sirius and Rigel 256 152 069 4 jets plus X.

CAPCOM Okay, Noun 61 longitude was 16514 and the other is correct.

SC Roger. I got minus 16514. Is that right?

CAPCOM That's Charlie.

SC Okay.

SC Houston, also we're going to vent the battery compartment there. That's up to about 3.6 and we'll do that along with the rest of the dump.

CAPCOM Roger.

PAO This is Apollo Control, Houston at 188 hours 1 minute into the flight. That was Al Bean taking down the midcourse correction number 5 maneuver pad. We're looking at GET of ignition 188 hours 27 minutes 13.74 seconds with a total Delta V of 2 feet per second.

CAPCOM 12, the computer is yours.

SC Roger.

PAO We presently show Apollo 12 at 180 772 nautical miles away from Earth, now traveling at a velocity of 3021.2 feet per second.

CAPCOM Apollo 12. Omni Bravo.

CAPCOM Apollo 12. Omni Bravo.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, 06:29 CST, 188:07:00 GET 550/1

SC Apollo 12, OMNI ALPHA, OMNI ALPHA.
SC Apollo 12, OMNI ALPHA. OMNI ALPHA.
SC Apollo 12, OMNI ALPHA, OMNI ALPHA.
SC Apollo 12, OMNI ALPHA, OMNI ALPHA.
CAPCOM Apollo 12, Houston.
CAPCOM Apollo 12, Houston.
SC Right, here, Houston. We got you on the
high gain, now, and the H2O2 fuel filter is working (garbled).
Just a second and I'll start check. Okay?
CAPCOM Roger.
CAPCOM Apollo 12, Houston. You can hold off on that
battery B charge until tomorrow.
SC Okay.

END OF TAPE

PAO This is Apollo Control Houston at 188 hours 23 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft currently traveling at a speed of 3033.2 feet per second and is presently 180151 nautical miles away from earth. We are 4 minutes away from MCC ignition.

SC - depth by burn time. What would you like for us to do about that, we can purge oxygen a minute and 20 for each or we can do something else.

CAPCOM Stand by, Pete.

CAPCOM Apollo 12, Houston. You can go ahead and continue along with the purge through the burn.

SC Okay.

PAO We are 30 seconds away from ignition for MCC 5.

PAO 10 seconds away now.

PAO GMC reports plus X, we will stand by for a burn status from Apollo 12.

SC Hey Houston, the burn is complete.

CAPCOM Roger 12.

SC The residuals were zero.

CAPCOM Roger.

PAO That was Pete Conrad reporting the burn was completed with zero residuals. We are at 188 hours 28 minutes into the flight and Apollo 12 now 179992 nautical miles out from earth.

SC For your information, this EMS is useless for this kind of thing, I finished the burn as (garble) 1.8 feet per second, it's got pretty sizable bias on it. I haven't reported this before because it has been working and meeting all (garble). But in the in the (garble) it goes down to minus 1821 and has been consistent that way throughout the flight.

CAPCOM Roger, Dick.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Will you enable an AC roll on debth and also we are showing that you are weight is about 400 pounds heavier then what we passed you in the pad.

SC Okay, now Houston you want us to roll the (garble)?

CAPCOM Stand by for just a moment Pete.

SC We are rolling.

CAPCOM Pete if you have already eaten you can go right on to the B23's and the attitude for those are in the flight plan and they are good.

SC Okay.

PAO This is Apollo Control Houston the B23 reference there is computer program 23 syst lunar day course navigation. We now show Apollo 12 at 179851

APOLLO 12, MISSION COMMENTARY, 11/22/69, CST 06:44, GET 188:22 551/2

PAO nautical miles away from earth traveling at a speed of 3039.6 feet per second. We are at 188 hours 34 minutes into the flight of Apollo 12 and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, CST 0656, GET 188:34 552/1

SC Houston, Apollo 12.
CAPCOM 12, Houston. Go ahead.
SC Roger. For these P23's I gonna disable
2 quads in the DAP. Which 2 do you suggest?
CAPCOM Alpha and Bravo. Disable Alpha and
Bravo.
SC Roger. Alpha and Bravo disabled.
CAPCOM And 12, you can give us OMNI Alpha
as you approach the high gain limits.
SC Roger. OMNI Alpha.
PAO This is Apollo Control Houston at
188 hours 52 minutes now into the flight of Apollo 12.
Apollo 12 now traveling at 3050.7 feet per second. Its
present distance away from earth now 179 280 nautical miles.
We've not been in contact with the Apollo 12 spacecraft for
some several minutes. The Apollo 12 crew now making preparations
for cislunar navigation tasks. However, our earlier contact
with Pete Conrad and Al Bean specifically they sounded fresh
and chipper. Each reported approximately 12 hours of sleep,
giving a combined total of 36 hours, probably some kind of
record for sleep in space flight. We're at 188 hours 54 minutes
into the flight and we will continue to monitor the air to
ground loop.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, GET 1885400, CST 0716 553/1

CAPCOM Apollo 12, Houston.
CAPCOM Apollo 12, Houston.
CAPCOM Hello 12, Houston.
SC Go ahead Houston.
CAPCOM 12, do you have a reason for not selecting
valves tempos for the P23?
SC Do you read the CMP, Houston?
CAPCOM That's negative Pete, we're not picking up
the CMP at all. The only transmissions we've heard are from
you.
SC (garble)
CAPCOM Okay, Dick you're coming in now.
CAPCOM Okay, Dick we've got you, go ahead.
SC (garble) these valves couple off and are far
too sensitive. (garble)
CAPCOM Okay, Pete, or Dick, good idea, thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 CST 727 GET 18905 554/1

CAPCOM Hello Pete; Houston.
SC Go ahead Houston.
CAPCOM You gave us a battery manifold pressure
of 3.6; would you confirm that that is volts?
SC Yeah - that - well, I read it wrong.
I was looking at the wrong thing. It was 1.8 volts.
CAPCOM Rog - we did a little head scratching
down here on that one; thank you.
SC Sorry - sorry.
CAPCOM No problem; it's good to exercise the
system.
CAPCOM Apollo 12, Houston. High gain antenna
angles for your next P23 attitude; pitch, minus 55, yaw 3,
PAO This is Apollo Control Houston. We are
at 189 hours, 15 minutes now into the flight. At the present
time Command Module Pilot Dick Gordon exercising the onboard
navigation system, going through a series of program 23 sys-
lunar navigational checks, with star sightings. We presently
show Apollo 12 178 606 nautical miles away from earth; it's
velocity reading 3 064.4 feet per second. We are 189 hours,
16 minutes and continuing to monitor. This is Apollo Control
Houston.

END OF TAPE

SC Houston, 12.
CAPCOM 12, Houston. Go ahead.
SC Okay, I got a question for you.
CAPCOM Go ahead.
SC Anybody got any suggestions down there on how we could warm up the cabin a little bit. It's getting a little cool in here. Can we go kinda like we do on the launch day or whatever it is and maybe run the secondary loop without any cooling on it or something to get some heat in here?
CAPCOM Stand by, Pete.
SC Houston, 12.
CAPCOM 12, go ahead.
SC Roger, how many marks is that on the second star? I've lost count. Is it 2 or 3? I believe it was 3.
CAPCOM Stand by, Dick.
SC And also, ask if they want the trunnion biased before I finish off this set.
SC Ed, you still with me?
CAPCOM Yes, we're still with you. Right now they're still scratching their heads. Just a minute, Dick.
SC Well, tell them to quit scratching. I'll say that was 3, and I'll press on and I'll do another trunnion bias. They don't have to worry about it.
CAPCOM Okay, Dick. We concur.
CAPCOM - - down here was that we didn't have data when you were taking your first mark, so we really weren't sure where you stood in the total flow.
SC All right. That's our fault, Houston.
We're the - -
SC Ed, does that mean you want me to do that first set of stars over again?
CAPCOM Negative on that. We've got it recorded, and we'll dump the take - we'll have it dumped and take a look at it.
SC Okay, thank you. I'm going to have to do another trunnion bias and press on to star number 3.
CAPCOM Okay, Dick. Very good.
PAO This is Apollo Control, Houston. We're 189 hours, 39 minutes now into the flight. That conversation with Dick Gordon who is going through his star sighting navigation program coming up on his third star. Apollo 12 now 177 917.5 nautical miles away from earth traveling at a speed of 3 078.4 feet per second. This is Apollo Control, Houston.

END OF TAPE

PAO Apollo 12, Houston for your calibration attitude
give us OMNI Delta.
SC Roger going OMNI Delta.
CAPCOM 12, Houston.
SC Go ahead.
CAPCOM We have a procedure here for warming up the
cabin.
SC All right.
CAPCOM Okay, take the glycol EVAP temperature in
to manual and adjust the primary glycol EVAP in valve to
obtain a temperature of the glycol evaporator OUT of 55 degrees.
SC Okay, glycol IN valve to manual and adjusted
glycol temp to an in of 55. Thank you. And be advised we're running
one cabin fan right now.
CAPCOM Roger. Pete, on that last procedure, we want
to adjust the evap temperature OUT to 55 degrees.
SC Roger temp out. Did I say temp in?
PAO This is Apollo Control, Houston. 189 hours
46 minutes now into the flight. That was CAPCOM, Ed Gibson,
passing along procedures for warming the cabin slightly.
Somewhat earlier Pete Conrad had reported to Mission Control,
Houston that it was a little chilly inside Apollo 12 this
morning. We're at 189 hours 46 minutes and we presently
show on our displays that Apollo 12 is 177 697 nautical miles
away from earth and traveling at a velocity of 3 082.9 feet
per second. This is Apollo Control, Houston.
CAPCOM Apollo 12, Houston do you still have the high
gain angles for the P23 attitude?
SC Yeah, I think I have them here in REACQ,
say them again.
CAPCOM Roger, that's PITCH minus 55 YAW 3.
SC Yeah, we got them.
CAPCOM Roger.
SC Houston, 12 on the high gain back in the P23
attitude.
CAPCOM Roger, Pete. We've got you loud and clear.
SC Say Ed you're getting pretty doggone good at
this CAPCOMing aren't you?
CAPCOM Oh, yeah. I enjoy it. Getting a little
practice on these coast periods. Like I say, however, Paul
Weitz is a real sleep expert.
SC I kinda figured last night we must have gone
through two CAPCOMs asleep.
CAPCOM Yeah, you went through a few. Paul Weitz came
in here and was waiting 6-1/2 hours for the big moment and
then you over slept and he went out of here with a long face
again.

CAPCOM However, he's on for reentry, he's assuming
you're not going to be sleeping through that.

SC I don't think we will be. Who's the flight
director down there today, right now?

CAPCOM We've got Pete Frank.

SC Oh, I thought if it was Jerry I'd let him
listen to some of my music.

PAO Apollo Control, Houston. 189 hours 56 minutes.
That was a rather casual exchange between Spacecraft Commander
Pete Conrad and Capsule Communicator, Ed Gibson. You heard
the reference to the sleep. Pete remarked considering the
amount of time they slept, he thought perhaps they had slept
through at least ten CAPCOMs. As you'll recall, they reported
earlier some 12 hours of sleep apiece. We presently show
Apollo 12 at 177 392.9 nautical miles from earth, now traveling
at 3 089 feet per second. This is Apollo Control, Houston.

END OF TAPE

SC Houston, Apollo 12.
CAPCOM 12, Houston, go ahead.
SC Roger. Have you been looking at this
P23 ignition?
CAPCOM That's affirmative and we copy you
are on the (garbled)
SC (garbled) I've dropped back to zero
optics.
CAPCOM Yes, stand by Dick, we'll be right
with you.
SC Okay.
CAPCOM Dick, would you take the optic switch
to zero and wait 30 seconds.
SC How does it look, Ed?
CAPCOM Stand by, Dick, we're still looking at
it.
CAPCOM Dick, could you give us P00?
SC Okay, you got it.
CAPCOM Dick, we'd like to sit here in P00 for
about 5 minutes. It may be a possible software problem.
SC Okay, Ed, no problem.
SC You've only got (garbled) to do
realignments.
CAPCOM Roger.
SC (garbled) got back in EMU.
CAPCOM Pete, you were way down in the noise
level there. Could you say again?
SC (garbled)
CAPCOM It sounded too good to miss.
SC I just said that it sounds like (garbled)
is getting back in the game again.
SC That's right. He's been itching to go
since launch.
SC Okay, since after launch, huh?
CAPCOM That's right, about a minute after
launch.
SC Say, how about looking on the records
down there and find out how long it was from the time our
fuel cells dropped off the line till we put them back on.
Would you do that?
CAPCOM Roger, we sure will.
CAPCOM 12, I can read up to you a portion of
our news broadcast that we're going to read up to you a
little later on. It's on that subject, and it was tentative.
Analysis shows that the Apollo 12 was struck twice by
lighting during liftoff. Don Arabian told a press conference
gathering in Building 1 that the strike occurred at
36 seconds after liftoff and again at 52 seconds after the
Saturn left the pad. According to Arabian the rocket and

CAPCOM the engine plume exhaust acted just like a wire that ran from the clouds to the ground and then from cloud to cloud. There are photographs available of the strike. The Arabian analysis is called a very interim kind of report.

SC Hey, that's great. We're sure looking forward to seeing those films. We saw it from inside, but we'd sure like to see it from outside next time.

SC You said it.

CAPCOM How did it look visually from the LM, looking at the command module/service module interface?

SC Well, we've been discussing that subject and I guess you ought to go look at some photographs of the CSM's that have (garbled) on the nose and make sure that it's not from (garbled) but (garbled) command module and service module was black on top when you return, and - however, I noticed on the top of the black boxes on the service module some similar paint marks. We were discussing it here and our suspicion was possibly the lightning strength always goes to a small point and we were suspecting up here you had a (garbled) that we probably got struck on the tower and just went all the way into static.

CAPCOM Roger, Pete.

SC I wonder if they are going to revise the weather rules for launch?

CAPCOM I guess they are looking at it. What's been said so far under identical conditions with an identical spacecraft you wouldn't do it over again.

SC These three guys would. (garbled) the crew.

SC I guess we hold the world's record now as the world's fastest lightning rod.

CAPCOM The world's tallest.

PAO This is Apollo Control. That was Pete Conrad saying I guess we hold the world's record now as the world's fastest lightning rod. Ed Gibson, capsule communicator, rejoined with - and the world's tallest. We're at 190 hours 14 minutes into the flight, presently showing an altitude above the earth of -

END OF TAPE

This is a revision of page 557/2, as originally issued.

APOLLO 12 MISSION COMMENTARY, 11/22/69 CST 0821 GET 189:59 596/A

CAPCOM the engine plume exhaust acted just like a wire that ran from the clouds to the ground and then from cloud to cloud. There are photographs available of the strike. The Arabian analysis is called a very interim kind of report.

SC Hey, that's great. We're sure looking forward to seeing those films. We saw it from inside, but we'd sure like to see it from outside next time.

SC You said it.

CAPCOM How did it look visually from the LM, looking at the command module/service module interface?

SC Well, we've been discussing that subject and I guess you ought to go look at some photographs of the CSM's that have (garbled) on the nose and make sure that it's not from (garbled) but (garbled) command module and service module was black on top when you return, and - however, I noticed on the top of the black boxes on the service module some similar paint marks. We were discussing it here and our suspicion was possibly the lightning strikes always goes to a small point and we were suspecting up here you had a (garbled) that we probably got struck on the tower and just went all the way down the stack.

CAPCOM Roger, Pete.

SC I wonder if they are going to revise the weather rules for launch?

CAPCOM I guess they are looking at it. What's been said so far under identical conditions with an identical spacecraft you wouldn't do it over again.

SC These three guys would. You left out one item, the crew.

SC I guess we hold the world's record now as the world's fastest lightning rod.

CAPCOM The world's tallest.

PAO This is Apollo Control. That was Pete Conrad saying I guess we hold the world's record now as the world's fastest lightning rod. Ed Gibson, capsule communicator, rejoined with - and the world's tallest. We're at 190 hours 14 minutes into the flight, presently showing an altitude above the earth of -

END OF TAPE

PAO 80 hours 14 minutes into the flight. Presently showing an altitude above the earth of 176 854 nautical miles for Apollo 12 and with a velocity of 3100 feet per second.

CAPCOM Hello, Al, Houston.

SC Go ahead.

CAPCOM Okay, on your request before. We showed that at 36 seconds 3 fuel cells went off, at 1 plus 42, 2 fuel cells were unlined at 1 plus 70 - or I'm sorry that's 142 seconds, 2 fuel cells were unlined and 170 seconds the third one came on.

SC Okay. We'll read the chart of the memory every (garble). We had to give it a lot of thought since we (garble) but we will try to think about it right now so we could remember when we got it back on.

CAPCOM Roger. Did they indicate barber pole after that 36 seconds?

SC Oh, yes, they indicated barber, all 6 of them at barber pole and fuel cells 1 2 3 lights were on and AC bus 1 and 2 lights were on, and AC bus 1 and 2 overload were on and fuel cell bus disconnect was ON and main bus A undervolt, main bus B undervolt, and every one of those things were ON.

SC I also looked at the malfunction procedures and this bussing covers that particular series of lights.

SC We knew there wasn't - -

SC The funniest part about a situation like that is you get, or lets say you get for example, a fuel cell and an AC, an AC overload, the main bus undervolt, you'll work on the fuel cells cause you know the problems probably down in the AC somewhere so you start in the AC. That's probably what we did. We started working on the AC and they were all good. Then we went up to the overload and it looked good, then we went up to the mains and they looked pretty good except the undervolt and we finally go the fuel cells to work. I didn't have idea one what to do.

CAPCOM That's Al Bean reporting on the lights that came up during the launch phase. We're at 190 hours 21 minutes now into the flight. Apollo 12 presently 176 662.4 nautical miles away from earth. Velocity now reads 3104 feet per second for Apollo 12.

SC Apollo 12, Houston. We're looking at a middle gimbal angle down here of about 58 degrees.

CAPCOM Roger.

SC Okay - we just been talking in here and we just thought of something. When we lost the 3 fuel cells which was at the 36 second which was the first time lightning struck, of course, we didn't realize that we got hit twice, however, the platform didn't go when all the fuel cells went so it must have been when we got hit the second time that that dumped the platform. Now it's beginning to make sense. I've been - its been bugging me all along how we lost the platform so late. We didn't know whether it just slowly went off because of the 24 volts or what, but it sounds like now what happened was that if we - in fact we did get hit twice, why the second time that got the platform.

CAPCOM Yes, that may be. They've been looking over all the traces down here and talking to all the lightning experts and I think they have some tentative ideas on that. They'll probably be able to give you some pretty concrete discussion on it when you get back.

SC Okay.

PAO Apollo Control Houston. At 190 hours 25 minutes that was Ed Gibson conversing with Pete Conrad. Apollo 12 now 176 518 nautical miles away from home and traveling at a velocity of 3107 feet per second.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Okay, 2 things, first of all, we did confirm that you lost your platform at 56 simultaneously with the second strike, and also on the optics problem, we suspect that it may be due to operating the optics switch at the same time as VERB 37. We'll be coming up to you with some DSKY entries to check this.

SC Okay.

CAPCOM Dick, could we have a clarification on something that happened a short while ago, and that was, what value had you loaded into the EMS counter before MCC5?

SC Oh, 2.0.

CAPCOM 2.0.

SC There's so much bias in that thing, it almost counts up - so much bias in there that it almost counts up as fast as it counts down.

CAPCOM Roger.

SC Hey, I've been wondering if we ought to - Dick and I discussed this much earlier in the flight and wondering if we can calibrate that accelerometer here in flight during GTA and I'm just wondering if we oughtn't do that. This thing is really bad news, its got a lot of bias on it.

SC Maybe the GTA doesn't work in flight, I don't know but we ought to see whether we can get that bias out of the EMS.

CAPCOM Pete, one thing that we're suggesting down here is to load in 102 or 100 and whatever it is and fly with that.

SC It does the same thing.

SC That won't work either. It does exactly the same thing.

CAPCOM Roger.

PAO The EMS they're talking about there is the entry monitoring system.

END OF TAPE

PAO The EMS they're talking about there is the entry monitoring system. We're at 190 hours, 30 minutes now into the flight of Apollo 12.

CAPCOM Apollo 12, Houston with the DSKY entries.

SC Okay, wait one. Okay, Ed. We're ready to copy.

CAPCOM Okay, what we're doing here is setting the optic status word or OP modes to a known configuration. We do that with a VERB 21, NOUN 01 enter 1331 enter 130 enter. And then if you would cycle the optics zero switch OFF and then ON, and we'll be watching it down here and stand by.

SC Roger, Ed copied the thing on the optics mode VERB 21, NOUN 01 enter 1331 enter 130 enter, optics zero OFF and then back ON.

CAPCOM Affirmative.

SC Okay, optics zero is OFF and goes back to optics zero.

CAPCOM Roger. Apollo 12, Houston. That looks as though it cleared the problem. We're ready to go on with the P23's.

SC Do you want another trunion bias, or is that okay, the same one I had?

CAPCOM Stand by, Dick. Dick, Houston.

SC It hasn't changed the whole flight.

CAPCOM Dick, we better go ahead and get another optics cal.

SC Okay.

CAPCOM Dick, go ahead and scratch the optics cal. Looking at it, we feel you can get away without it.

PAO This is Apollo Control, Houston. Dick Gordon now returning to program 23, his navigational star sighting program. What they were doing there were through known DSKY displays calibration the optics. An earlier suspect was that the - that by operating the optic switch simultaneously with hitting VERB 37 on his keyboard made the optics think it should be in zero. We're at 190 hours, 37 minutes now into the flight. We presently show the spacecraft, Apollo 12, at an altitude above the earth of 176,169 nautical miles and returning home at the present time at a velocity of 3114 feet per second. This is Apollo Control, Houston.

END OF TAPE

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Okay, clarification on that OPTIC squell on - if you go to OPTIC 0 and then hit VERB 37 before 15 seconds have elapsed you can run into the problem which you did.

SC Okay, we understand, thank you Bill. He thinks that's exactly what he did (garble). He says it's some ignorance.

CAPCOM And 12 one thing, on your gas separator, we'd like to try and see how well that thing is working. You can go ahead and remove the gas separator cartridge and run on the H2 separator only and continue on that unless it's not doing the job and then you can go back to your normal configuration.

SC Well, let me tell you what we've done, anyhow, already. We've been running our thump system without the cartridge and we've been running the gun with the cartridge for the whole flight and the cold water output is very, very good on this food system. Our water output still has a tendency to get some air in it but I kinda suspect that there's just a little air or hydrogen or whatever it is in the water. When you heat the water, that makes the air bubbles expand, and we'll go ahead and pull the cartridge off the gun and operate without it and see how that goes. We have had the cartridge on the gun the whole time.

CAPCOM Okay, thank you, Pete. And also you could go ahead and pick up some fire data on Dick and Al during the course of the day, we'd appreciate it.

SC Okay, I'll have them hookup.

SC Uh, we thought we were hooked up, we forgot.

CAPCOM Rog, surgeon is looking at you now. And 12 when you finish up with the P23 we have a high gain test here. It's an engineering attempt to isolate the problem area and we're looking for a thermal problem in the high gain antenna electronics.

SC Okay, very good.

SC You got something we can copy down now we'll go ahead and copy it.

CAPCOM Okay. Coming up. Coming at you first of all with a SWISH configuration. S-band transponder to primary, S-band auxiliary to TAPE, tape recorder PCM analog, tape recorder to record, S-band antenna, high-gain, high-gain power ON, high-gain SERVO electronics -

SC Let's take it a little slower.

CAPCOM Okay. Let's go back, S-band transponder PRIMARY

SC Okay, you've got Al really smoking, we don't take shorthand up here, gang.

SC Go ahead, Ed.
CAPCOM Okay, Al, are you ready? S-band transponder
PRIMARY
SC Yeah, I was ready last time. I've got it all
the way down to power ON.
CAPCOM Okay, that's high-gain power ON and then high-
gain SERVO electronics, two primary. Okay, then set up the
following attitude.
SC Okay you're on.
CAPCOM PITCH 0, YAW 69.9 and ROLL 50. Attitude dead-
band of .5 which I believe you have in there now, so it's no
change. You're a quarter at MSFN in the manual mode and then
switch to the auto REACQ mode and narrow beam width. High
gain angles from manual acquisition are minus 22 on PITCH and
YAW 194. Okay, then if we detect a loss of lock or if you
detect oscillations turn the DSE on by placing the tape
recorder switch to FORWARD, and go ahead and get data for
5 minutes and then stop the recorder, and then at that point
we've got a little set of procedures we'll follow through
here and we can read them off to you at the time as you're
going through them step by step. What essentially we're doing
is looking at the effect of hardware versus secondary trans-
ponder where primary versus secondary electronics and wide
beam width versus narrow beam width.
SC Okay, I understand now that you want the trans-
ponder in primary.
CAPCOM Al, could you hold it a minute.
SC S-band on to tape switch, sure.
CAPCOM Okay, we'd like you to go ahead and get that
optic scale now that you're finished with the P23.
SC Okay, start working on it now.
CAPCOM Okay, Al go ahead with your readback.
SC Okay, you want the transponder primary and
then you want to put the S-band OFF in tape, put the receiver
to PCM analog and record, go in to high-gain on the S-band,
put POWER ON with (garble) primary, go to a spacecraft at-
titude of PITCH share a YAW 69.9, ROLL 50 with a deadband of
.5. We'll ac - we'll acquire MSFN manually, switch to the
REACQ mode with narrow deadband and those angles are minus 22
and 494 and as we noticed a loss of lock, we noticed that
we get oscillations, we turned the recorder OFF, for at least
5 minutes.
CAPCOM That's right and if you run into loss of
COM you'll be able to pick us up on OMNI Bravo.

END OF TAPE

CAPCOM That's right, and if you run into a
loss of COMM you'll be able to pick us up on OMNI BRAVO.

SC Roger.

SC Houston, Apollo 12.

CAPCOM 12, go ahead.

SC Hey, Ed, on this - about this (garbled)
this maneuver, if you people down there on the ground are on
this you noticed it's quite a ways away from both attitudes
when we were doing the P23's themselves. For the next series
of stars - I haven't looked at them yet, but for our next
series of P23's, we can check that to make sure that we'll
have this right maneuver. We're looking at it also right
now, and if we do, lets pick a different star from the
optics panel. We don't need the stars bringing us (garbled)
we can use almost any star we've got out there.

CAPCOM Okay, Dick, we understand that.

SC (garbled)

CAPCOM Roger, we understand that request, it's
a good idea. We'll be doing that.

SC These (garbled) angles are such in the
sun that you don't have one, but I think you can give me one
near P23 attitude that I can use for the trunnion bias or
optics cal. If not, by golly, use star 12.

CAPCOM Roger, we concur with that down here.
We'll be doing that for you, Dick.

SC Hello, Houston. How do you read?

CAPCOM We read you loud and clear.

SC Okay, got the DSKY there for the first
optics cal.

CAPCOM Roger, we're looking at it.

SC Okay. Here comes the second one.

SC There it is. And there's the third
one. And there's the fourth one. Okay, Ed, that's it.

CAPCOM Okay, that looks good. Thank you.

SC Okay, now we'll go ahead and maneuver
to the attitude for this S-band.

CAPCOM Okay.

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Those sightings look pretty good. You
had a good state vector in there and the sightings essentially
change it so your reentry angle changed by .035 degrees.

SC Okay.

PAO This is Apollo Control Houston at
191 hours 1 minute now into the flight. That was Ed Gibson
talking to Pete Conrad. We now show Apollo 12 at a distance
away from earth of 175 439 nautical miles.

CAPCOM 12, go ahead.

SC Hey Houston, can you have the guys there determine whether they want us to do a 47 or leave it the way it is. (garbled) P47 mode designated.

CAPCOM Roger, Dick.

SC What I'd like to do is go ahead and leave the state vector in there that I've done and see if I can improve on it with this next series of marks.

CAPCOM Dick, we concur. That sounds good. Go ahead and do it that way.

SC Thank you.

CAPCOM And Dick, when you like, we could take a look at your next set of P23's on page 3-173 and look at your second optics cal.

SC I only need the second one.

CAPCOM Okay, well you do the first one and then about 30 minutes later - 30 or 40, you probably want to pick up a second one.

SC Yes, that's true, if I can get myself in gear and get going and get all those in before 39's are up. However, go ahead.

CAPCOM Okay, if you don't get them all in before you require another one, perhaps the easiest way to do it is to just pitch up 57-1/2 degrees so that your zero line of sight is then right along star 160. That's probably the smallest attitude change.

SC In other words, go ahead and pitch up 57-1/2 and use star 160 -

END OF TAPE

SC In other words, go ahead and pitch up 57.5 and use star 160 for the trunnion bias now.

CAPCOM Roger, that's the star you happen to be going -

SC Isn't that what you told me?

CAPCOM That's affirmative. That's the star you happen to be working with.

SC Okay. Okay, I'll do 16 here. We should get that one over in a half hour with no strain. I'll do star 160 and then pitch up 57.5, do the cal and press on.

CAPCOM Rog, actually any star you're working with, whether it's 160, 171, or 163, which ever one you happen to be at.

SC Okay, and I understand. That figures.

SC Houston, 12.

CAPCOM 12, go ahead.

SC Ed, I'd like to think about just pitching up 57. Whether I pitch, yaw or a combination of them depends on step angles in that particular star. Does it not?

CAPCOM Roger, Dick. We were just talking about that down here. That's a pilot pitch of 7 and 1/2 degrees, and it may be getting you into the problem with the middle gimbal angle. What we can do down here is, and plan to do is to work you up a calibration star for each one of the stars you'll be working at, and we can give it to you at any time you want it during the P23.

SC Okay, that sounds like an awful lot of work. Why don't you give me a normal map star or a star that's in the vicinity. ROLL 090, PITCH 329, YAW 332. Give me a star that's close to that.

CAPCOM Roger, okay, we'll do that, Dick.

CAPCOM 12, Houston, could you go on back to balance couples now?

SC What would you suggest. Thanks for reminding me. I switched to AUTO maneuvering on that except for the actual P23, and we really intend to.

CAPCOM Rog, Dick, that makes it a little easier to keep track or to make sure we got a good state vector for you.

SC Rog, I understand all the problems, but just during the marking I want to be in the unbalanced, and all of our maneuvers should be within a couple or 3 degrees.

CAPCOM Guess that vehicle is a little sensitive right now, isn't it.

SC It sure is. I'm having peak and impulse.

SC Houston, that was your alert light.
Could you see it?

APOLLO 12 MISSION COMMENTARY 11/22/69, CST 9:25, GET 191:03:00 562/2

CAPCOM Stand by, 12. Apollo 12, Houston.
Apollo 12, Houston.
SC Go ahead, Houston. Did your cool alert
thing come in?
CAPCOM Apollo 12, Houston. Houston did not
send a cool alert. We're checking with the sites now.
SC No, you misunderstood me, and we have
the gimbal lock light on.
CAPCOM Okay, yeah, we misunderstood.
SC Yeah, we didn't put a gimbal lock when
the alert part of it was on.
CAPCOM Apollo 12, Houston. We would expect
that light, and you're still about 15 degrees away from getting
into a problem.
SC We're watching, and we have another
problem here. Look at our attitude and I got a 58 P and
I can't maneuver automatically away from this thing. You
think we ought to zero the OCU's one time?
CAPCOM Dick, say again your last comment.
SC Well, look where we are. There's our
attitude, and I can't maneuver past this automatically. I
get a 6 18 and it says we're there.
CAPCOM Okay, Dick. Stand by.
SC Wait a minute, we're right there. We're
okay. Hey, we're crazy up here. We're all right.

END OF TAPE

CAPCOM - okay Dick; stand by.
SC We're okay, we're okay. Hey, we're work
crazy up here; we're all right.
CAPCOM 12, we agree with your last comment.
SC We'll explain this to you later; we
don't want - well, we'll explain it later, we have a good
reason for it but we don't want to tell everybody.
CAPCOM Okay.
SC What he's saying is we are dumb dumb
up here.
CAPCOM No, we agree with the last comment; not
the first one.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM We got the folks down here thinking
about the difference between the 5018 and the 618; are you
thinking about the same thing?
SC No, naw - we (laughter) we were just
dumb dumb sitting here looking at 69 degrees yaw which is sitting
right next to gimbal lock in zero pitch and wondering why we
were sitting there and it wasn't maneuvering when we were really
in the right place; that's all.
CAPCOM Roger.
SC Not used to sitting in an attitude like
this where we're looking at a red ball. Hey Ed, I have a feeling we're
telling you too much and you're all getting nervous down there.
CAPCOM Apollo 12, Houston. Would you confirm
that you've got the switch configuration as we've brought up,
and also that you have gone to REACQ in narrow beam?
SC Roger - it's all set.
CAPCOM Roger; okay, now in that attitude, we've
got the sun looking right up the engine bell and that ought to
be heating things up as fast as we can do it.
SC Okay. Don't forget we've been operating
in secondary SERVO up until about 5 minutes ago; we switched
to primary for this test.
CAPCOM Roger Al.
CAPCOM Apollo 12 Houston. We see no FM sub-
carrier down here; would you confirm that the S-band recorder,
or S-band aux is to tape?
SC It's on tape.
CAPCOM Thank you.
SC How about a reset - how about a reset;
yeah.
CAPCOM Roger.
CAPCOM 12; Houston. We have the sub carrier now.
What we're going to be doing now is just sitting here and seeing
if the problem will appear and we are looking for a 6 degree
decibel drop in signal or your report a hunting in the antenna.

SC Okay.

CAPCOM And 12 this could go on for a little while; we'll continue this for 4 hours, or until our problem is identified.

SC Okay, very good.

CAPCOM 12, Houston. While you are sitting there backed up to the fire; we have some news for you if you like.

SC Go ahead Ed.

CAPCOM Okay, 12; there are some pretty good football games on tab today in the college rings. Ohio State and Michigan tangle in a big 10 game. The Buckeyes are favored to win and retain their number 1 rating. If Ohio does win, and retain it's number 1 ranking, it will be the 6th time in modern football history that a team has won the title 2 years in a row. In other games, UCLA is favored over Southern Cal; Purdue is favored over Indiana; Oklahoma is the choice over Nebraska and TCU should beat Rice. Princeton plays Dartmouth, and Washington meets Washington State, and we're not guessing the outcome with any of those. Texas University is open and they are looking towards A&M on Thanksgiving. Houston is picked over a tough Wyoming team. We will keep you posted on the games that are going on this afternoon. Texas is now accepting ticket orders for the Cotton Bowl and the Sugar Bowl. The winner of the Texas Arkansas game on December 6th goes to the Cotton Bowl to face the fighting Irish. And the loser will play Mississippi in the Sugar Bowl in New Orleans. Willie McCovey of the San Francisco Giants that beat out Tom Seiver of the Mets for the National League's Most Valuable Player Award. The big game in pro ball on Sunday is the Dallas Cowboys against the Los Angeles Rams. The Oilers will be playing the Miami Dolphins down in Florida. Meanwhile, the Oilers report that line backer Ed Watson has been placed on waivers to make room for Woody Campbell. A Delta Launch Vehicle has placed Britain's first communications satellite into an orbit from Cape Kennedy. It's called Skynip. Now in an elliptical orbit, the satellite will be placed into a synchronous orbit of 22 300 miles on Sunday. And the world and national news headlines; the Senate has rejected the nomination of Judge Clement Haynsworth by a 55 to 45 vote. Henry Cabot Lodge has resigned as Ambassador to the Paris Peace Talks and Charles DeGaulle is 79 today. All 3 Apollo 12 wives wowed the news media yesterday as they paraded out of the Conrad house in stunning white suit pants; they each carried a sign which read, "Proud, Thrilled and Happy". The family activity will be rather restricted this weekend. Dick, Barbara will attend Mass this Sunday, or this morning at 8:30, and Al, Sue will attend a luncheon today at the Lakewood Yacht Club and will visit Mission Control this afternoon at about 3 PM. Pete, Jane will be going shopping today for

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 19115 CST 037 563/3

CAPCOM Chris' birthday present. She is also scheduled to go to the Yacht Club for the luncheon. On Sunday after church they plan to go on a picnic at Cloverfield with the Royce's. Your father in law is expected to arrive here sometime Sunday and will remain until after splash down.

SC Thank you Ed.

CAPCOM Your welcome.

SC Apparently (garbled) those Cougars today.

CAPCOM We'll do it Dick.

CAPCOM And 12, it's been about 5 hours now since you started accelerating back towards the Earth.

SC Great.

PAO This is Apollo Control Houston at 191 hours, 33 minutes -

SC Hey Ed - I noticed that 15.97 degrees north, and 91.62 east?

CAPCOM Roger Dick.

SC And I have this now; (garble) 174 480 miles out from Earth and traveling at 3 150 feet per second and our entry angle to the Earth at this time is minus 78.11 degrees.

CAPCOM Dick that sounds good. They are all right ON.

PAO This is Apollo Control Houston. That was Dick Gordon reporting our spacecraft distance from Earth, and velocity. The reference that Gibson made as he - just prior to reading up the news, the reference to backed up to the fire, refers to the attitude which the spacecraft is currently in, which puts the service propulsion system engine bell toward the sun. During this attitude, they are running a test on the communications system between the spacecraft and the ground. These procedures being passed up a short while ago to them. We are at 191 hours, 35 minutes into the flight and this is Apollo Control Houston.

END OF TAPE

SC Houston, this is 12.

CAPCOM 12, Houston, go ahead.

SC Ed, we'd like for you to tackle one more thing. We have done a PTC alignment just prior to this test before we got this attitude and before we come out of there I wish you would remind us to review our angles on the PTC. This thing has been drifting pretty badly in yaw the whole flight, in fact, it's up to I think pretty close to 10 degrees an hour in yaw, but we would like to give you the numbers just before getting out of this attitude.

CAPCOM Okay, Dick, we'll do that.

CAPCOM Apollo 12, Houston with some news on how your ALSEP is doing.

SC Go, man.

CAPCOM Okay, the central station is still performing well. RTG output is around 73 watts, and as of just a short while ago, they've sent up a total of 382 commands. PSE has gotten into a stable temperature equilibrium on 126 degrees, and they have observed at 3 different times, the the tracings have shown that there was some seismic activity taking place. The LSM is increasing in activity as the moon is entering a magnetic zone between the earth's two solar shock waves. That is, the moon is approaching the center of the earth's magnetic tail near lunar noon where the field is the lowest, and at that point the LSM site survey will be accomplished. And the solar wind is perking right along and doing real well.

SC Say, Ed, from all they know now about watching the temperatures, do they forecast this will last for 2 years?

CAPCOM The folks down here are pretty optimistic, but I'll have to ask to see if we can really extend it that far. I'll try and get you an answer to that, Al.

CAPCOM And 12, Houston, the folks down here have thought a little bit about your 2 EVA's, especially the geology involved and have a few questions which were stimulated by what you said during the EVA's and after it, and any time you would like to have a discussion of those questions we are sitting here waiting for you.

SC Okay, Ed, we're in the middle of a big garbage cleanup right now and as soon as we get the place spruced up we'll be with you. It will take us about another hour or so.

CAPCOM Okay, Pete.

PAO This is Apollo Control Houston. We are presently at 191 hours 48 minutes into the flight and now show Apollo 12 at 174 029.8 nautical miles out from earth and coming in now at 3159 feet per second. We'll keep the line open and continue to monitor any conversations as they may develop. That was Ed Gibson passing along the news of ALSEP to the Apollo 12 crew. This is Apollo Control Houston.

END OF TAPE

CAPCOM 12, Houston in another 3 minutes we'll have a slight handover and you'll get a temporary loss of signal.

SC Okay.

SC Houston, 12.

CAPCOM 12, go ahead.

SC Roger, Houston. (Garble) down there and we're ready for your question.

CAPCOM Okay, Pete, we'll be with you in just a minute.

PAO This is Apollo Control, Houston at 192 hours 17 minutes into the flight. That was Pete Conrad calling Capsule Communicator, Ed gibson, saying they're ready for the geology questions.

CAPCOM One question is, can you give a little more elaborate description of the pattern ground with the ridges and grooves, that is were there are several scales of a pattering and was there a difference bearing strength of the surface on the patterned ground?

SC You're referring to the takes that look like streaks and that we talked about that were in different directions also that the - so that they weren't essentially the LM exhaust plume, is that what you're talking about?

CAPCOM Yeah, you talked - you described some which were perpendicular to the dis - to the direction which you thought the exhaust plume would normally give pattern ground.

SC If I remember corectly that was at the Surveyor crater and I think that we noticed these radio streaks almost everywhere, don't you agree, Al?

SC Yeah, we'd see some and then we'd go through an area that wouldn't have any, then we'd see another area and then there would be an area that wouldn't have any so we were seeing them frequently, you know they weren't very isolated but they were all over. The ones down at the Surveyor crater were from - looked to me like the north, northeast, running southwest, wouldn't you say, (garble) and then (garble) them look out from under the LM, for example, they were north, running south and maybe northwest running south - I can't remember now, but I'm sure it's on the voice tape. Besides as I recall, Peter may recall it differently, it's hard to remember, some of these things. They looked to me like they were about maybe an eighth of an inch to a sixteenth of an inch and wide and they maybe were a - as you looked at them real close they looked like they were about a sixteenth of an inch high or less and then maybe they were about 3/8 of an inch between little hills. something like that would be my guess. We think the -

SC Yeah, I agree with that. You mentioned bearing strength. I think the bearing strength to the ground generally

SC speaking in the surveyor crater and up around as we approached it from the far side on our traverse and everything was probably some of the firmest ground we were on, it was the ground that we sank in the least. There was one place we got into, when we got out, boy that was a sharp crater, Al. Where we felt that the ground was much more soft and powdery and we were therefore not as good bearing strength.

SC Yeah, I think it was sharp.

SC And I can't - I can't say that I remember any radio pattering out there as sharp to speak of.

SC I don't remember any either. One thing - we know we did that gold camera right at the very end and I don't think I was able to get any of that pattern ground, I should have, but the time just ran out before I could get very many pictures. We came back here and I did take it with a 70 millimeter several times.

CAPCOM Roger. Over what extent did that pattern ground occur and can you relate it to anything that you've seen back here?

SC Well I don't think we paid that much attention to it, other than when we were aware of it, it was all around us like the Surveyor crater, going down it, just walking down to the Surveyor was when we noticed it there while we were resting and to what extent it went I really can't say but like Al said I think we came across it in several places.

END OF TAPE

SC I really can't say, but like Al said we came across it in several places, and I really - I don't think it's more an impression than anything else, but I really don't remember it out there by Sharp crater or anything and that ground was sort of soft and maybe finer grained than we've been on. So that may be a very pertinent point that the more firmer ground that we're on the more we would see this radial or pattern.

SC Hey, and that's something else I haven't thought of, Pete. Remember that firm ground also was the same ground we came up on when I said it looks this ground has got kind of little blobs in it, and it looks like what a nice small level dirt field would look like if it just had some very light rain on it. Remember when we looked at that? That's was -

SC You're right. That was when we were on firm ground right there. That's a good one. I hadn't thought of that.

SC I do remember now looking at that pattern to see where it went, and usually if I was near it and looked out in a distance it looked like it went in the direction of the grooves, as far as I could see out in that direction, you know, and be able to see any detail that fine. In other words I never did look either left or right on those groove patterns where it looked to me like it went all the way out to the limit of vision to seeing them. I never saw any sort of contact along the transverse direction of the grooves either in Surveyor crater or in front of the LM or a couple of other places we happened to walk around.

SC Yeah, now that I mention it, we saw I guess at least 3 basic types of ground. One that we were on most of the time that we discussed like right outside the LM, we saw the kind with the grooves, we saw the kind with the little like rain drops on it, and we of course got pictures of all the different kinds, and then we saw - we saw some more finely powdered ground like out around Sharp crater and we saw some more finely powdered like is down on the inside of the small craters and some - to some extent on the inside of the Surveyor crater. Those are all the different types of soils that I can recall. However, they all have the same color. Boy, there was other than the fact that you're suddenly aware that you've been further or you just have to be thinking about them and looking at them at the time they were still distinguishing in colors or anything like that. Now, there might be a subtle enough distinction in colors that from a far distance where rays out of these craters give you that pattern, but when you're standing right up close to it that was not at all apparent

SC Yeah, now Al mentioned a very good point. There's no doubt about it that the ground looked different the second day than the first due to the sun angle getting higher, however, on the horizon the horizon remained approximately the same and again I think it's because of the greater distance and the fact that the angle between us and the sun was still relatively small looking at a distance. And the rocks still looked white out there, chalk white. I'll bet if we stayed there and let the sun move to 90 degrees that what we saw in the distance would change in color.

SC Yeah, I agree with Pete. Now one interesting thing, when we were out at the Surveyor that was sort of tan my visual impression was that radiation or something had darkened the paint, but when you look at the chrome surface, the only surface I saw that didn't look this way were the barer surfaces by the way. But you look at the chrome surfaces of, for example, that battery box. It had changed almost the same color that light tan. Now maybe if we looked at it that first day and it had been in sunlight it wouldn't have looked light tan, it would have looked light gray, but it looked like tan if we ever get this portion, because we got the cameras with us, but when I rubbed the box it took off the light gray coloring, but it just didn't dust off. I'm pretty sure that we didn't put it on with our LM. It looks just like dust that hangs around your house that's only been there a day or two. It was like dust that's collected on there for a long time and longer to have some effects on it, long enough so that it really becomes not a thick coating but a very cohesive coating. It was almost like a skin on there. You had to rub hard to get it off that battery box. When you did there was a nice shiny chrome beneath it. It's really kind of a strange thing like a bunch of dust had blown on the box and it had stood there long enough to really get hard, but I think there's going to be enough parts that have not been touched by either our gloves or by the bag that the camera is in that you'll be able to get a good hack on that.

CAPCOM Rog, I imagine also, we'll get -

SC Like the TV mirror.

CAPCOM Go ahead, Pete.

SC Yes, the TV mirror that has only my finger marks on it, and I'm sure that nothing else has touched any of the rest of that TV mirror, and it was covered with this fine dust. Also, in the same place with the mirror, Pete, although the mock up didn't look this way as I remember there's a lot of electronics exposed in behind that mirror that of course we never could possible touch. It should have the same coating in there or something. The other most important thing is the Surveyor was equally brown all

SC the way around it and had recovered it coming in I think we can see the directional pattern on the Surveyor, so I don't think, as a matter of fact, the way that dust flew when we landed, I don't think any of them landed within 10 miles of where we landed as it took off. I kind of agree. And even if it did it wasn't going to involve the crater, just shoot right across it. Yeah, and the Surveyor was lower than we were. Hey, Dick I just thought of an interesting possible point that somebody wants to do when they get with that camera. The geologists want to look at it when they get the camera before they give it to the scientists, is back in there behind that mirror where all the radiation could get in to. It couldn't get into as much as it could into let's say the top. The camera got radiation all day long because it would get it the minute the sun came up and get it all the way around to sunset. Inside that little hole where the mirror rotates, there's going to be parts in there usually calculable that got just only a certain amount of sun each individual day. Like say some parts would only get 10 percent of the sun on the outside, some parts on the outside would get 50 percent, so if they're very careful with that rear surface in the back of the rear and inside that little hollow place they're liable to get some index on how fast this stuff builds and when it does.

CAPCOM Roger, were you able to notice any kind of vertical -

SC They'll have to be careful - -

END OF TAPE

SC (garbled)

CAPCOM Roger, were you able to notice any kind of vertical (garbled) Go ahead.

SC I think you are going to want to have something thought through before that camera goes whistling off in the distance. This is going to take a lot of proving around with before all that information could be lost.

SC Yes, that's true, Al. We'll have to be careful how we handle that. Did you notice any vertical gradient in the color on the Surveyor as you might expect if it was dust?

SC No, it was pretty well uniform all the way over it. Pete brought out a point. It's strange, too. It was all the way around. I all looked the same. You see we approached from the opposite side than we landed, and that was our first impression coming up on the opposite side was that it was brown. It didn't look brown the day before in the shadow, either, it looked white. And of course it was out in the sunlight by the time we got to it on the second EVA.

CAPCOM Okay, a question on the veisculation of rocks. Did you really notice any or an appreciable amount of vesiculation in any of the rocks you saw?

SC Not one. That's what's funny. I guess Neil and Buzz brought some back but we didn't see one rock anywhere with any of that type structure.

SC I agree with Pete. One time I reported that I did, and then I looked at the rock when we finally picked it up and it didn't look like it at all. It had a bunch of pits on it, but it didn't have any vesicles in it and we were all doing something else and so I never really went back and corrected myself, but I've got to agree with Pete. I never saw any vesicular material at all.

SC I'm not convinced that we got too much different kind of rock material to tell you the truth. Of course, I got fooled out there in the desert, so anything that we saw that remotely resembled being different to our eye we brought you a sample.

SC I don't think we - I think we got a sample of almost everything that was there. Everything that we saw that was different textured or the way it weathered or where it was setting or anything else that seemed unusual to us about the differences of rocks, we grabbed some of them, but like Pete says, it's going to be interesting to see how many different things we did actually get.

CAPCOM Pete and Al, were you able to notice any - which appeared to be boulder tracks on the head crater or any of the other craters similar to the type of tracks you saw after you rolled that one rock down?

SC None. None that - well, let me say this. I was - without walking down to the crater I couldn't

SC tell what kind of a track the rock made rolling down there to start with. However, I think we have enough canned photos that you can stereo in the craters that we went up to that if there any boulder tracks you're going to be able to see them.

SC Yes, I think that's the best point right there. We took enough so that you're going to find them. Now, I don't remember seeing any myself, but I think - I also don't remember specifically looking for them. Usually when you see them, if you see anything special like that you'll remember it, but maybe there are some around and I didn't even notice them.

SC All right, let me ask a question down there - while we were in orbit we passed a particular area and I ought to go back to the map and look, where there were 3 or 4 bright craters that had very, vary dark gray material streaking down the side of them like landslides. Now, we were aware of many places by using the monocular, seeing landslide type or slides or slump in all the craters all around the whole moon that we could see, but there were only these 3 or 4 craters that had a very decided gray slumps or streaks or something. It almost gave you the impression that there had been a liquid spill or something. It was so different from anything else. Has anybody reported that, or have you seen them in your photographs from earth before?

CAPCOM We'll try and get you an answer to that, Pete.

SC That boulder thing got me to thinking about that. Go ahead with your question.

SC Let me say something else, too, I can't remember if I said it. You know where we talked with Al (garbled) and the guys before we went about the main objectives of the geology wasn't to go out and grab a few rocks and take some pictures, but to try to understand the morphology and the stratigraphy and what have you of the vicinity you were in. Look around and try to use your head along these lines. Well, I'll tell you, there wasn't less than 10 times I stood in spots, including in the LM both times we were back in, and said, okay now Bean, what can you do in that - can you fill that square? Is it possible to look at there and try and determine where this came from, which is first, which is second and all that, and except for deciding which craters looked newer than others, which we know from ground observation, I was not able to see any special little clues like we were, for example, over in Hawaii and we were when we were out at Meteor crater and other places, that gave us that kind of clues. That whole area is just - has been acted on by these meteoroids or something else so that all these features that are normally neat clues to you on earth are not available for observation. I didn't find any way to fill that - those 2 big squares, you know, I never was able, when walking up to

SC determine when the normal ground and the ejecta started except on the distance in slope or the fact that it got a little bit more powdery under my feet, and that's not a very good index. I never saw anything that had a different color or a different amount of rocks or anything else except the times that Pete and I kept kicking up that very light gray as opposed to the more dark sea-bed gray material. There's just no contact to look at.

SC I think even a trained geologist would have trouble doing a whole lot of skilled geology that way on the moon. I think what you're going to have to do is pick your traverses like we did and just sort of select at a regular interval as you go along and then go back and analyze the stuff to find out differences. I've kind of got the idea that a lot of it is the same and the only different being its relative age to one another by being blasted by a meteor coming in and getting thrown out at different times, so, do you think that, Al?

SC I think that. I think one of the things you're going to want to undo is you are going to want up the number of core tubes so you can get down in these areas you are interested in and find out what's going on under there, because it's covered with this layer and there just ain't no way to figure it out. I know, thinking back - like I say, Pete, before the EVA, during the EVA and afterwards we talked about it and thought about trying to get the big picture, trying to be board and rock collectors picture takers, and believe me, we worked at it and I think from our training we were pretty doggoned good at getting that sort of thing in training, not just grabbing a few rocks, but trying to evaluate the things that we want to evaluate, but it just was difficult to do because the clues just aren't right laying there on the surface. It's got this big blanket of all beat up soil over every single thing. I think maybe you want to get a better trenching tool. Pete, the trenching tool we had was just that shovel and he could only go down about 8 inches without falling on his head. Now, if you don't want to get a lot of core tubes but you want to see what's going on maybe we need some sort of better trenching tool so a guy can lean over and trench down 6 or 8 inches or at least as far as the ground is soft and then take a look at what's underneath it.

SC We were really interested in the fact that we could not bend over. It wasn't as apparent in our training as it was up there because in your training when you weigh 285 pounds there in the building and you've got all the stuff on your back, it's fairly easy to sort of squench down or lean quite a bit. You can't do that up there on the moon and like Al just said, and I'm short and low to the ground to begin with, if somebody that's taller than I am is going to have a difficult time with the same length tools

SC trenching as deep as I did

SC Somebody that is taller than I am is going to have a difficult time with the same lane too, trudging as deep as I did. Because you just can't get over. And we've really - we got a whole bunch of ideas and we're gonna, in the 5 days there in the MQS, we'll put all this down on paper on what we think we could do to pass on some suggestions to improve the tools that we have right now, to do a little better job. Yeah, I think those tools can really be worked over; they seemed pretty good before we left, but once we got up there and started working with them, in that 1/6th g, like Pete says, you can't always do the same things; you're leaning in a different way, and things are a little different. I think we thought about it enough and observed it enough that we can come back and give some pretty good suggestions for tool improvement and equipment improvement along those lines that'll help the next guys get more rocks, and better rocks, and faster, and treadge deeper, and do more core tubes or whatever else they want to do. Hey tell them they can start fixing that doggoned hammer.

CAPCOM Okay - thanks for your comments.

SC Hey we concluded that everything is too delicate to start with; the extension handle was about wiped out by the time Al got done driving that double core tube. Yeah, even though you're light up there; everything's light; we could still get something like a hammer swinging, or if you get moving, and want to stop, you could still put some pretty good loads on some equipment.

CAPCOM Okay, Pete and Al. That's it for the questions. Thanks very much. Could you give us a reading off the O2 pressure gauge on the repress pack?

SC Yeah, one more thing. Getting back to this crater morphology and all that business; when we looked at those craters we try to do that too, cause we can see dead rock, or what we thought was dead rock, on the outside, we said, "Great, we're going to look at those craters." This is what we said before we even got out. "We're going to look at those craters and we're gonna see a deep contact between the ragalef and the bed rock, and we're going down a little bit further and here's going to be something else; we really got it knocked." We looked in those craters and what it looks like is just like the surface except there is a few rocks that seem to be resting on the wall and resting in the bottom. Now if you went down there and dusted away all that material, I don't know how much there is there, maybe you would find a contact between the ragalef and the bed rock, now you know, you really couldn't see it. Now maybe you could infer it, with the pictures we took and what we discussed, usually we show it here and there, particularly on that very last crater. But that's going to take some work; it's just not like looking at a crater on Earth.

SC So I think the - the fact that it has this makes the geology up there as difficult, if not more difficult, as it is on the Earth, because you have trees, and grass and all kinds of things like that that hide a lot of the earth's geology. So you may get the same problems up there. (Garbled) - the repress package is 850 psi.

SC Another thing that has been concerning me a little bit - you know we keep talking about going to all these neat places like Hygeneous Rill and all that stuff, because we are going to stand on the side right below the rill and we are gonna look up on that big high side and right there is going to be the history of the moon, sorta like the Grand Canyon gives us such a great one of the Earth. Well I'll tell you, if the sides of that place are anything like the sides of craters, or the sides of the Surveyor, you're going to look up there and you're gonna see a bunch of dust just like we see on the surface, unless - you know - I could be easily wrong, we haven't done this but - but we just didn't see any places, no matter what the slope, that didn't have all this material all over it.

CAPCOM Roger.

END OF TAPE

PAO This is Apollo Control, Houston at 192 hours and 46 minutes into the flight. Now you've been listening to a long discussion on geology between Pete Conrad and Al Bean aboard the spacecraft. And Ed Gibson here in Mission Control Center along with Gibson at his side is Astronaut, Geologist, Jim Schmidt who is working with Ed in preparing the questions. While we have a slack moment in conversation we would like to pass along an announcement. There will be an ALSEP briefing for newsmen in the main auditorium at 12 noon today.

CAPCOM to the VC counter, it looks as though the thing's working pretty well from what we can determine. We've looked back at midcourse 2, LOI 1 and LOI 2 and the lunar orbit plane change, both of them and TEI and it looks as though it's predicted in the crew readout, and they're doing pretty well. There is pre - pretty close agreement.

SC Okay, Ed.

SC What you say - what you say is generally true, now and the reason I say that is because those burns are being held up till about 20 seconds or so before burn-time. I go by the PIPPA bias exactly what time it came out to be, 1.4 feet per second in one minute which is really power and there's no question about that and now the other thing, the other information I've got is that (garble) and run up to 10 seconds (garble) test, you always come up with minus .1 which seems to be a little higher than what we expect to see although we are still within power, I don't see anything wrong with it. During the RCS burn and the burn took a little time to do as it came out and during that time the PIPPA bias on the bias and the four other BIAS and the EMS was actually almost as high as my ability to trim so that's why you got us (garbled) on that, that had a little something to do with the separations of the booster at the TLI also but I'll talk about that later.

PAO Apollo Control, Houston. We presently show an altitude of -

CAPCOM We're within tolerance, However, Dick.

SC Oh, that's correct, uh huh. I recognized that, I just want you to know that that's what we've got guess that's the real world.

PAO We presently show an altitude of 172 138 nautical miles above the earth for Apollo 12. Now traveling at 3 208 feet per second.

SC Hey one last comment, there, Houston. How about telling old Jewel Grand that we both thought we were in Capoho too when we were on that moon and we gave him about the - about the same type of information that we gave

SC them at Capoho as far as it was visible.
CAPCOM Roger, Al, will do.
PAO This is Apollo Control, Houston, Capoho is on
the big island of Hawaii. We're at 192 hours 51 minutes into
the flight.
CAPCOM 12, Houston.
SC Go ahead, Houston.
CAPCOM Say, if it's possible for you to see out of
the rendezvous windows to get a good shot at the moon we'd
like to get some more small scale high latitude photographs
and this would be at your convenience. If you think you can
do it, give us a call, and we'll give you some procedures.
SC Okay, now we just took some about 2 hours ago.
Some 250 millimeter of the moon which, of course, are full
frame. Would you care for some now and what lens would you
like.
CAPCOM It sounds as though you pretty well out guessed
us. The Hasselblad with the 250 millimeter lens black and
white film, 5.6 1/250th and then of course at infinity and
if you take two or three photos and repeat approximately at
30 minute intervals for one hour.
SC Okay, we'll (garble). Okay, we got it. I'm
sorry.
CAPCOM 5.6.
SC Okay.
CAPCOM 12, Houston.
SC Go ahead, Ed.
CAPCOM Apollo 12, Houston, are you observing any vari-
ation in the antenna position at the present time?
SC No. I've been sort of watching it, Ed, the
only thing I've noticed this whole time is every once in a while
the YAW will - -

END OF TAPE.

SC Every once in awhile the YAW will just wiggle one time, and that's the only thing I've seen. Otherwise it's been steady as a rock.

CAPCOM Okay, read just a couple of variation signals to us down here.

SC Okay, now wait a minute here, that just made a liar out of me, because it's just starting to do it up here. With the signal strength (garble) and it's doing it in YAW. (garble) in YAW.

CAPCOM Just started to pick that up down here. DSEI please. Out.

SC DSEI. Roger. Okay, now the recorder is on and we're in low; do you want us to go to high bit rate?

CAPCOM Affirmative, high bit rate.

PAO This is Apollo Control Houston at 192 hours and 59 minutes. Apollo 12 going through a test exercise now with the Sun looking at the face of the antenna. We presently show Apollo 12 as at 171 819 nautical miles away from earth.

CAPCOM Apollo 12, tape recorder to stop.

SC Okay, that's done, Ed.

CAPCOM Thank you 12, it looks as though it's settled down. Let's just keep an eye on it.

CAPCOM 12, DSE to forward.

SC Yep, we got it.

PAO Apollo Control, Houston, the DSE being the data storage equipment, it stores data and various information during flight and during periods of loss communications and plays them back later. We're at 193 hours 4 minutes into the flight. Apollo 12 now at an altitude of 171 664 nautical miles above the earth. Present velocity 3212 feet per second.

SC Houston, Apollo 12.

CAPCOM 12, Houston. Go ahead.

SC Roger. Let me give you the angles on the DSE at this time.

CAPCOM Go ahead.

SC Okay. ROLL 072.25, PITCH is 352.4, the YAW is 081.55.

CAPCOM Roger, Dick. Copy. 072.25, 352.4, 081.55. Thank you.

SC Roger. I'd like to get (garble) attitude.

CAPCOM Okay.

END OF TAPE

SC Houston, 12.
CAPCOM 12, go ahead.
SC It looks like what the antenna's done
now is driven to some position other than (garbled) and it's
just sitting there.
CAPCOM Roger, Pete. 12, would you go to
wide beam width.
SC Roger, wide beam width.
CAPCOM Thank you. Apollo 12, DSE to OFF.
SC Roger, it's OFF.
CAPCOM Apollo 12, is the antenna holding
steady at the present time?
SC As best as I can tell it is, Ed. It's
moved a little bit from where it was a little while ago, but
it's not wobbling like it was doing the other day.
CAPCOM Roger.
SC I take that back. It may be wobbling
just a little tiny bit. It's just a very slight oscillation
in signal strength and maybe, of course, our gage is not
too (garbled) for being so inclined - it looks like it might
be oscillating a degree or so.
CAPCOM Roger, thank you.
SC And that's normally yaw.
CAPCOM Roger, yaw.
SC The other day when we were in the LM,
Dick was having that trouble, and it was oscillating in
both axis, pitch and yaw.
CAPCOM 12, Houston.
SC Go ahead, Ed.
CAPCOM For your next P23 at 195 we have
another calibration star which I think will work out a
little bit better for you when you're ready to copy.
SC Go ahead.
CAPCOM That's at star 24, Gienah, and the
attitude is ROLL 092, PITCH 329, YAW 0. And that should give
you a pretty small angle difference between the next attitude
you could go into.
SC Okay, thank you. Appreciate it.
This ought to be a very interesting one too, Ed. Because
I noticed on the other series - the first series of P23
that you know has a usually a pretty dim in the normal
optics mode, but I'll be interested to see if I can see
the star through the map on my site. I'd like to try it. It
sounds good to me.
CAPCOM Roger, Dick.
PAO Apollo Control, Houston. That was
capsule communicator, Ed Gibson, talking to - -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69 GET 19322 CST 1143 572/1

PAO This is Apollo Control Houston; that was Capsule Communicator Ed Gibson talking to Dick Gordon concerning his next set of navigational star sightings. We now show Apollo 12 at 171 111 nautical miles away from earth, traveling at a speed of 3222 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69 CST 1154 GET 193:34 573/1

CAPCOM Apollo 12, Houston, Would you put the DSE at FORWARD, please?
CAPCOM 12, could we have the track mode to NARROW?
SC You got it.
CAPCOM Roger.
SC Man, is this is chocolate pudding and butterscotch pudding ever good. You ought to try some.
CAPCOM Roger, Dick, I'd like to trade you.
SC Not yet, Ed, not yet. 2 more days and you can.
CAPCOM Apollo 12, Houston. Could we have secondary electronics?
SC Secondary electronics coming up.
PAO This is Apollo Control Houston at 193 hours 42 minutes into the flight. You heard a brief earlier comment from Dick Gordon about the chocolate pudding and butterscotch pudding, obviously undergoing a lunch break. We show Apollo 12 presently at 170 488 nautical miles traveling at a speed of 3236 feet per second. We continue to monitor, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69, CST 12:04, GET 193:44:00 574/1

PAO This is Apollo Control, Houston at 193 hours, 44 minutes into the flight. Apollo 12 now at an altitude above earth of 170,438 nautical miles, traveling in at a speed of 3237 feet per second. At this time we will take the release line down to allow you to listen to an ALSEP briefing which will be taking place shortly in the main auditorium of building 1. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69, CDT 12:05, GET 193:45:13 575/1

CAPCOM Apollo 12, Houston. Would you give
us secondary transponder and pause at the time position.
SC Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 13:00CST GET 194:38:00 576/1

PAO This is Apollo Control at 194 hours 38 minutes.
Apollo 12 is 168 721 nautical miles from Earth. Velocity
3 275 feet per second. The crew of Apollo 12 is now in the
process of doing cislunar navigation, this exercise moved
up one hour from the flight plan. At the completion of the
S-band high gain antenna test, it was decided to proceed on
with the V23 navigation sighting rather than go into passive
thermal control for an hour and then start the sighting so
that cislunar navigation was moved up 1 hour and the crew is
in the process of doing that now. There's been very little
conversation during the ALSEP News Briefing.

END OF TAPE

PAO Due to the antenna test or the navigation sightings. We have turned that tape over to the transcript people, we will now continue to standby live for any further air to ground communication.

SC Houston, Apollo 12.

CAPCOM Go 12.

SC Guess what. I don't have a star.

CAPCOM Say again, please.

SC I said I don't have a star.

CAPCOM I think you're going to have to try that again. We're breaking up in communications and we don't read you down here.

SC Roger. How do you read now?

CAPCOM It's still breaking up, but probably readable. Try it.

SC Okay, I did not have a star for star number 56. There is (garbled) star 204.

CAPCOM Roger.

SC Tell the boys in the back room I don't have a star for this particular one in the field of view. I can't see it.

CAPCOM Roger, we'll work on it.

CAPCOM Dick, part of that test we wanted to make sure whether or not you could not see the star because of light shafting. Was that the case?

SC It's light out there. I don't necessarily see any light shafting but I sure can't see the star in the field of view.

CAPCOM Roger.

SC I don't know why or what the reason for it is.

CAPCOM Okay, the nav star then is star 24 and the earth far horizon.

SC Okay.

PAO The CAPCOM is Don Lind.

END OF TAPE

APOLLO 12 MISSION CONTROL 11/22/69 12:07CST GET193:34:00 578/1

CAPCOM Apollo 12, Houston, could you give us your onboard readouts of the high gain antenna angle pitch and yaw?
SC Roger. PITCH is about a minus 20 and YAW is about 190.

CAPCOM Roger, we copy.
CAPCOM Apollo 12, Houston and would you select wide beam width and then go to MANUAL and select PITCH 60, YAW 240. That's a PITCH of minus 60.

CAPCOM Apollo 12, Houston would you give us AUTO REACQ.
AUTO REACQ.
SC Okay, you got it, Houston.
CAPCOM We're with you, thank you. We barely dropped off there when you went to manual and that was pitch minus 60, yaw 240.

SC That's correct.
CAPCOM Apollo 12, Houston. Would you give us the pitch and yaw reading on the high gain antenna.
CAPCOM All right, Jer, it looks like minus 22 and 1 - I guess about 190.
CAPCOM Roger, 12, and also if you would the DDC angles.

SC Okay, standby (garble).
CAPCOM Roger.
SC Okay, Ed, here's the best thing that'll get her for you, ROLL is 093.1, PITCH is 339.25, YAW is 086.4.
CAPCOM Roger. 093.1, 339.25, and 086.4.
CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Okay, we're finished up with the (garble) test on the S-band and we'd like to go to low bit rate. The S-band off to OFF and tape recorder FORWARD to OFF, and we will be staying in the wide beam width.

SC Ed, you want us to stay on the secondary transponder.
CAPCOM That's affirmative.
SC Okay, what's the test look like Ed?
CAPCOM Standby and we'll get a summary of that for you, and Dick before you go over to the P23's you want them - they want to manually maneuver away from gimbal locking.

SC Okay, I got a whole hour before P23, Ed, I think we ought to (garble).
CAPCOM Standby.
SC Look at the Earth for a while.
CAPCOM Dick, at this time you can go on over and do these P23's, the angles we already gave you are still good. In a minute when you finish up with that let's go back to PTC - -

APOLLO 12 MISSION COMMENTARY 11/22/69 12:07CST GET 193:34:00 578/2

SC Okay you want us to do a P23, we're going to
have to do them an hour early, is that correct?
CAPCOM That's correct.
SC Okay, here we go. Houston, 12.
CAPCOM 12, Houston go ahead.
SC Roger. Here is the inner vector I have in
there for Venus at this particular title, okay knowing you're
an hour early. Is that right?
CAPCOM That's firm, Dick. That's good.
SC Okay, thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 13:11 CST GET 193:49:00 579/1

CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM We'd like you to dump the waste water down to
zero before you go into the PTC then we won't have to disturb
that later, if you would for us.
SC Okay standby, I want to get this BIAS curve
put it in BIAS here.
CAPCOM Sure anytime before you set up PTC.
SC Don, this is Dick again. Where did you want
to take the waste water down to before completing.
CAPCOM Take it clear down to zero, then you'll have
an undisturbed nights sleep.
SC Okay, now we've got that bladder all the way
down to zero.
CAPCOM Roger.
SC Okay. Houston, 12.
CAPCOM Go.
SC Don I was curious on that 6N when they used
star 204, how close is that to the sun?
CAPCOM We're looking it up for you Dick. Dick that
was 20 degrees, 20.
SC It seems like I should have been able to see
it, then, I don't know.
CAPCOM It's in that area where it's kind of marginal,
Dick and we were kind of interested whether you could or
could not see it.
SC Okay, well I sure looked all over in there
and I couldn't see any star in the field of view.
CAPCOM Roger.
SC (Garbled) I thought I was going blind.
CAPCOM Maybe that star didn't get turned on today.
SC Don, I was going (garble) and all kinds of
things like that but I thought I better not.

END OF TAPE

SC Tom do you want to take a E memory dump
at this time?
CAPCOM Give us just one minute to set up here.
SC Okay.
SC For the navigation expert's information,
this mass full of stars - the air glow is starting to show up,
and I'm starting to use the top part of the air glow for a vis-
ible horizon.
CAPCOM Roger Dick.
SC That first set was not (garble); at least
I couldn't tell that there was any air glow there anywhere (garble)
just used the high part of the horizon.
capcom Dick, we show you down to zero on waste
water now. Apollo 12, we are ready for the E mod dump.
SC Okay - here it comes Houston.
CAPCOM Roger - also Dick, how well could you
see Venus - the first star you did - and the 5th star, 163, were
those fairly visible?
SC That's affirmative. No problem with stars
at all; Venus of course look like about 4 of them put together.
CAPCOM Roger - very good -
SC Actually it is an easy - it's a very easy
planet to use for the simple reason that you can take the horizon
and strip the image of Venus so that you get a pretty good hunk
off of it.
CAPCOM Very good.
SC And the rest of them - the stars are so
dim that you really can't do that; all you can do is get the star
on top of the horizon, but on Venus you can actually split the
planet with the horizon.
CAPCOM Roger - copy.
SC Houston, let me know when you are through
with the E memory dump - want to take a look at 83 and see what I
did to my alter state vector.
CAPCOM Roger - we are through with the E mod dump
now, and when you look at 83, would you also look at NOUN 54 too,
so we can check that one.
SC Want it now?
CAPCOM Okay - very 83 -
SC Okay.
SC Okay - NOUN 54 is 6.24 miles and zero
velocity.
CAPCOM Roger.
SC How does it look down there?
CAPCOM Looks fine.
SC I'll do a P 37; see what it looks like.
CAPCOM Roger.

END OF TAPE

CAPCOM Apollo 12, for your information Michigan
leads Ohio State 21 to 12 at the end of the second quarter.
SC Okay. Starteling.
CAPCOM There's still a little more to go.
SC (garbled)
CAPCOM Go ahead.
SC Okay, ask (garbled) if he knows a secret
hiding place for P30 pads in the spacecraft.
CAPCOM We're not sure you're cleared for that
information.
SC Well, I'd sure like to be because we
ran out of them 2 days ago.
CAPCOM He doesn't know of any special place to
look. We'll ask around in the back room, but the first quick
guess is he doesn't know.
SC I don't think there are any, so we've
been (garbled) for 2 days.
CAPCOM Roger, we'll research it -
SC Some of these guys didn't have anything
to do anyhow.
CAPCOM We'll try to keep down the number of
midcourses so you won't need them anymore.
SC That's good, that's good.
PAO At 195 hours 14 minutes Apollo 12's
distance is 167 578 nautical miles, velocity 3300 feet per
second.

END OF TPAE

CAPCOM Dick, would you confirm that you terminated the water dump?
SC That's affirmative. We terminated when you hollered at us.
CAPCOM Fine. Thank you.
SC Why, doesn't it look like it?
CAPCOM We can't tell for several hours and they were worried.
SC Okay, I'll check again, but I know I did.
CAPCOM No sweat, if you did it.
SC Rest assured, it's terminated.
CAPCOM Roger. Thank you.
CAPCOM Apollo 12, Houston. According to all our information down here, the only P30 PADS you have are in that CSM update book and there should be only 12 of them counting both sides of the pages.
SC Yes. Okay, that time we ran out. That's all right. Just thought there were more some place.
CAPCOM Not to our knowledge.
SC We've already scrounged a couple P30 PADS out of (garble) books so when they think of those, forget them, cause we already got them.
CAPCOM Roger.
CAPCOM Dick, we rechecked your P37 solution down here in our computers, and it agreed exactly.
SC Very good.

END OF TAPE

PAO This is Apollo Control at 195 hours, 48 minutes - Apollo 12 is 166 500 nautical miles from earth and approaching at a velocity of 3325 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69 CST 1411 GET 195:49 584/1

SC Houston, Apollo 12.
CAPCOM 12.
SC Don, if you think we're stable enough
and it looks like we are under control down there we are going
to go ahead and start PTC.
CAPCOM We suggest you let your rates damp out
a little bit more.
SC That's a suggestion I'll gladly follow.
CAPCOM Roger.
SC I guess the reason that is, we're still
moving around up here. Everybody is cleaning up and shaving.
We're through dumping water and everything else overboard so
now we can kind of get started. Maybe we better get things
a little more calm inside here.
CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, CST 14:21, GET 195:59:00 585/1

CAPCOM Apollo 12.
SC Go.
CAPCOM Roger, the rates look okay to start up
on PTC. We'd like you to turn off the high gain at - turn
the power off and start with omni bravo as you start the PTC.
SC Okay, high gain power off and omni
bravo for PTC.
CAPCOM That's affirmative.
SC And we're on omni bravo.
CAPCOM Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 14:31CST GET196:09:00 586/1

PAO This is Apollo Control at 196 hours 18 minutes.
Apollo 12's distance from Earth now 165 521 nautical miles.
Velocity 3 347 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 112269, GET 19619 CST 1441 587/1

CAPCOM Apollo 12, Houston.
CAPCOM Apollo 12, Houston.
SC Go ahead Houston; Apollo 12.
CAPCOM Roger. We suspect that after the evaporator temperature is stabilized here and your PTC maneuver - the temperature in the cabin may get a little warm for you, so we want you to evaluate what that feels like before you get ready to settle down for the night, and we may either have to adjust the mixing ratio folder or go back to AUTO, at your choice.
SC Last night it was fairly cold PTC, and if it gets too warm this way, when we finally get in the proper attitude, well, I guess we will just have to turn it down a smidgen.
CAPCOM Roger - it will probably take about another -
SC (garble)
CAPCOM It'll take probably another hour to settle
SC Okay with us. Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69 GET 19629 CST 1451 588/1

CAPCOM Apollo 12, Houston.
SC GO.
CAPCOM Pete, sometime this evening if you've got time, we've got some geology questions down here that we would like to send up to you. When you want to discuss them, we'll pipe them up to you if that's all right with you.
SC Are these different from the geology questions we got about 3 or 4 hours ago? We're glad to do it.
CAPCOM That is affirmative. It's really a continuation of the same kind of material, but we've got 8 specific questions.
SC Okay, why don't we start in about - 10 minutes. We're cleaning up from a meal and will be ready to go in about 10 minutes.
CAPCOM Roger. Any time is fine. Thank you.

END OF TAPE

SC Hello, Houston. Apollo 12.

CAPCOM Go, 12.

SC All right. Roger. We're ready for your questions.

CAPCOM Okay. Let's start with two quick ones on the Surveyor work. The first one is, are you bringing back any glass from the Surveyor thermal switchplate?

SC No. The glass apparently, which we didn't know, was bonded onto metal, and the metal, in turn, was bonded onto the little standoff things that held it off the top of the box. We tried to get it, and everybody had told us back there, that it was going to have separated from its bonding, and it had not. It was in great shape. It was bonded to the metal just perfect. We beat on it, smashed it bent, but all we did was break it into little teeney, tiny pieces. Shattered it, actually is what happened, and it just remained fastened, very tenaciously to the metal it was bonded to. That was that. We just couldn't get it.

CAPCOM Roger. Whoever made that bonding material will appreciate that testimonial. Okay, on the second one, did you get any soil samples from the Surveyor trenching area other than the material that maybe with the scoop itself?

SC The scoop itself has some material left in it, I believe. So, it'll be in that bag, and that'll be it.

CAPCOM Okay. Roger. Next question goes to the geology area, and the question - well, I'll start out here. Did you ever find one of those mounds, and what more description can you give us the mounds and particularly was there any apparent orientation or elongation to the mounds. Also, anything about vent holes.

SC Okay. Now the mounds weren't that big that you would climb on. You could just stand and look at it. There were two of them. One was bigger than the other, and no, they didn't have any vent holes. Their orientation - both of them appeared to be in an east-west direction. Sort of - let's say you had a strip that was about a foot wide, that you just bent it and made a little triangular thing out of it. The mounds looked something like that, and sampled all around one mound. Brought back stuff from it, material, excuse me (garbled). That's about all I can say (garble). I guess your - I think your answer anything of volcanic in nature, and there didn't appear to be sitting up. They appeared more like a big glob of something that had been pitched into that particular area, either by the craters that were found near by or something else further away. We looked around for all evidences, vent holes or anything coming out of it that might be scattered around, you know. Let's say, rocks from it itself or some injected pyroclastics around on the ground might be near it. We couldn't find any of those either. I was kind of wondering

SC at the time why you didn't ask us to give a core tube through it, but you didn't.

CAPCOM Roger. Thanks. Next if there's no more in that one, the next one is whether or not you noticed any preferential distribution of the glass beads and the glassy material?

SC Generally speaking, it was all over the place in the bottom of even the smallest little craters that we came across. We found it wherever we went, and no more in one place than in another. I think that we have 3 or 4 samples of glass that looked the same that were taken from different places, and they should be documented. One of them isn't, but I remember where we got it.

CAPCOM Roger. I'm not sure I understand. Did you mean to say the glass beads were in the bottoms of all craters or that they were on the top of the level surfaces as well as in the bottom of the craters?

SC That's right. We walked around on the level surface. If you just look down and look even half way, you can find beads here and there. Now, you didn't find a lot of big ones. You'd run across big ones every once and awhile, big ones being about a quarter to three-eighths of an inch in size. If we came upon those, we would see them, but generally there were a lot of little ones around. Now, you could look down into the small craters, I'm thinking of the craters -

END OF TAPE

S/C - those we see, but generally there were a lot of little ones around. Now as you looked down in the small craters, particularly the craters 3 or 4 foot in diameter, maybe a foot deep, it didn't look like they were made with very big objects, you would usually find glass beads at the bottom and you would usually find glass covered rocks and that was surprising to us because we had always imagined that these beads just came from very - from the more larger craters up to 8 or 9 or 10 feet, but this didn't seem to be the case. Also if I remember, we have a rock which is a few inches or so in size that is splattered with glass and we brought it back for that reason. They are not beads - there is just a big splatter -

CAPCOM Apollo, great, great. We have lost antenna -

CAPCOM Apollo, great, great. We have lost COM for a moment.

CAPCOM Apollo 12, Houston. Do you read us?

CAPCOM Apollo 12, Houston. Do you read?

S/C Roger. We apparently lost your antenna for a while. We are ready to go again.

CAPCOM Roger. We switch antennas there. Al, the last thing we heard you saying was that in some of the small craters there were glass-covered rocks. Would you repeat anything after that.

S/C Roger. Did you hear Pete's description.

CAPCOM Negative.

S/C Okay. Right. I was saying that even the craters up to as little as 3 or 4 feet in diameter, 1-foot deep, the ones that didn't look to me like they were made by either very heavy particles or very vast particles, you could usually look around in the bottom of them and see glass-covered small rocks. We took some pictures and documented them real well and now let me say the rest. Also, one time when we were walking around outside a big crater, we saw a rock about 3 inches in diameter, I guess, somewhere around in that neighborhood and it was almost completely covered with this glass and the glass looked the same as the glass you see in closeup stereo pictures that Neil brought back, that he took pictures of, down in small craters. So this will be a nice sample for somebody to look over.

CAPCOM Very good. Okay. Next time - next question is - will you give us some more detail on the material that appeared to be melted in the bottom of Bench Crater. Now did this just cover the central peak or did it appear more extensively located - spread around down there?

S/C It appeared to be - to look - a little bit lava-like in nature but I don't mean to imply that I thought the crater was volcanic in origin. It look more to be like we were seeing the effects of some high-speed impact and it causing some melting of material down there. I wish that we could have gone down in that crater and got that sample but it was too steep and rugged for us to attempt it, and therefore we did take some partial PAN stereo of the whole crater for you and we tried to get material from the top but nothing from the top resembled the material in the bottom. I think the reason Pete said that to begin with is our experience over in the Hawaii in some of those chains of craters or those lines of - I can't think of the exact word now - but where the lava comes out in long cracks, those of weakness, it just sorta bubbles out and spatters one on top itself and ends up making sort of knobby-looking mounds of basalt. Well from the top of the crater all this stuff looked like knobby little mounds. They were sort of like (garble) - the material you usually see around (garble) and that is why he is trying to say - neither of us think it was a volcanic material but it had that sort of melted knobby effect. We took a lot of pictures of it though.

CAPCOM Roger. On the northwest side of Head Crater, you talked about a rock that you kicked over, and you mentioned that the bottom was different from the top and we are not sure just what way it was different. Remember that one?

S/C Well, yes - I remember it and it wasn't different in - I think maybe I should have clarified it then because it wasn't that big a deal - I guess it was the first time that we kicked over a rock, it was two different colors you know. Before you'd kick over a rock and it looks just like the top is the bottom. This one, it looked a little bit lighter gray and the reason was -

END OF TAPE

SC - like if the top is the bottom. This sort of looked a little bit lighter gray and the reason was, after I thought about it, was because we were marching around in that same area where we noticed that there were two different types of soil. The soil that was the top soil for just a thin layer on the top of an eighth of an inch or something, and then below that was the thin gray layer and that - what was causing the rock to appear white in this case instead of gray like the top was the fact that it's been in this light soil down beneath the surface. So, I don't think it's a big thing.

CAPCOM Roger. Let me give you the last two questions. So you can cover them together. The first one is, are there any special or unusual features that you remember, thinking back on it now, that you didn't have time to describe and the other thing is, can you sort of recap the traverse along each leg and recall what you think was the significant feature that you saw at each of the stations where you stopped.

SC Wait a while while we discuss it a second.

CAPCOM Sure.

SC I think we pretty well talked about everything that we saw that attracted our attention. We can't think of anything right now that we saw that we didn't mention to you sometime or another, either during the EVA's or after. Al's only comment, which he already said he talked about this morning, was the fact that the color did change with the sun angle between the first day and the second day. As far as the traverse goes, I guess that the most significant thing - there was nothing unusual at Head crater other than the - the fact that we found that - I guess, that Head crater was where we first saw the difference in soil below the ground and above the ground. The next most significant thing I think, is as we did go over to Sharp crater, - yeh - no, no, Head crater is not where we saw - the crater, what was the name of the crater that we saw the material we just discussed? Was it - that was Bench crater, right?

CAPCOM Say again on that, 12.

SC Wasn't the name of the crater - our second stop on the traverse was Bench crater, is that correct?

CAPCOM That's right.

SC Okay. The - I'd get our books out except they're so dirty with dust we'd have a heck of a time getting rid of the dust in the command module, I don't want to do that.

CAPCOM No, don't do that.

SC The - we discussed the difference in texture of the rocks at the bottom of that crater. I guess the next most significant thing was that somewhere between Bench crater and Sharp crater we obviously ran over what must be a contact in that the ground very definitely changed to a softer, finer dust. We sank in deeper out there not only right at

SC Sharp crater but leading up to it. Now, we both found it very difficult to ever walk slowly. We always went at a lope wherever we went, it just seemed the natural way to go. So, Al sort of started it first watching me run because he was behind and he could tell that - I guess I was kicking up more dust, is that right Al?

SC Yeh. That's right. It was obvious that Pete had started running on a different kind of ground, or dragging his feet, one. It turned out it was a different kind of ground.

SC And I guess that's the most significant thing over there on that part of the traverse. From there, we're not sure that we ever did get to Halo crater. There turned out, now I'm going to have to look at our photographs and I'm going to have to look at the maps again and figure out exactly where Halo crater was because there were about five little craters all of them which could have been Halo crater, altogether and it wasn't apparent at looking at the little map that we had which colored at that spot, whether there were five craters or two craters or what. And I had a very difficult time locating them. We suspect that we were not in Halo crater but if we weren't, we were awful darn close to it. I guess the next significant thing was the fact that from Halo crater, or coming up to Halo crater, we really got on a third type ground, which was ground which we discussed around the Surveyor crater which seemed to be the firmest especially down in the crater. It seemed to be the most firm ground that we were on. It still had dust, we still sank in but we sank in the least in the Surveyor crater, both going down to the Surveyor from the one side and going up towards the LM through that blocky crater on

END OF TAPE

SC through there from the one side and going up towards the LM through that Blocky crater on the other side nearest the LM. The Blocky crater was also an interesting feature and that may be something that we - I think we did discuss though as we stood there - was the fact that, that we saw that the Surveyor crater was an old crater as had been - if that did - -

CAPCOM Hold up for just a second. We're going to have to switch antennas and we may lose you for a second.

SC Okay.

CAPCOM Apollo 12, Houston. We've got a good signal. Go ahead.

SC Okay. I guess we discussed it that we felt the Surveyor crater must have been impacted very early and had bed rock and that this bed rock had weathered down to where the crater was very smooth and had weathered much there and along came another one and made this small blotchy crater in the side of it which must have been - which indicated to me that bed rock was not too far below the surface right where we were at the Surveyor crater. And of course we have samples of that. Something that Al and I just were talking about it you want me to mention that the Surveyor, except for the fact that it had changed color looked in very good shape. This is true. But there's something I noticed using the cutters, supposedly the tubes that we used to practice were exactly the same metal and aluminum that the Surveyor was made out of. And this is the case, something very definitely happened to the metal like it crystallized because it was much easier to cut the Surveyor's tubes except the one tube which I flat couldn't cut and I think that they were off on their dimension on that tube. It must have been a much stronger tube than they indicated. Much thicker tube, thicker wall tube. But the wire bundles that we cut too also had the appearance of being very brittle. They cut very, very neatly. I was - Yeah, the coating flaked off - the insulation. And there was one wire bundle that had a cloth insulation on it which was not on our mockup and there was a - the other wire bundle which was on the mockup was quite configuration than it was in the mockup. But these wire bundles seemed to cut quite easily also. And I don't think it was because I was juiced up, I think there were very definite crystallization or something there. You'll get to see that when the specimen gets back.

CAPCOM Very good.

SC I guess the last most significant thing is that Al and I and Dick also having watch our training were impressed with the fact that we managed to get as far out as we did. And that it was as easy going in that kind of country as it turned out to be. The distance that we covered, I guess we covered a little over a mile.

BEAN You put that on earth in your equipment, you get lunar weight equipment on earth, you could never make that traverse in that time. You would die before you got to the end and we weren't even sweating, we were kind of hopping around out there doing a job. The only thing that kept us from moving faster was there was so much to see. Also the only thing that kept us from studying more details of each site was the fact that we had to keep pressing on. So what's going to happen when we get back, we're not going to know all the details of each site because we just weren't able to stay there long enough, as long as we'd like to on any site. We could have spent that hold time in any of those craters, trenched around a little bit - looked at, collected different size rock type rocks around it and tried to go back and forth on the - check the blanket and see if we could discover any difference in texture and all that sort of thing. But the time just wasn't available. It was one of those things that - how much you want to cover, the time you've got to do it.

CONRAD Yeah. What Al's saying is we did Big Bent Hawaii, Meteor Crater and New Mexico all in one 2-hour trip around there. That's about what it amounted to.

CAPCOM Yes. You did a great job on it too. When you looked into the craters, did you notice any boulder tracks that indicated they'd been many rocks rolled down besides the ones you rolled down or accumulations of boulders at the bottom of these steep slopes?

SC No, not any particular distribution. When there were rocks at the bottom, it was in these Blocky craters where it looked like the material had been there.

CAPCOM Roger.

SC Now the dust is such, I'm sorry. I just didn't observe - there wasn't really standing in a position to observe.

END OF TAPE

SC I'm sorry. I just didn't observe there wasn't - really standing in a position to observe any track that the one rock made that I rolled down. The other rock that I threw down there was so small that it didn't go very far anyhow. Now, dust flew and the rocks both bounded and rolled depending on how far along it was going down the side of the crater. But it was not obvious to me that it was making any tracks. Now, had you stood back and looked at it from a different sun angle, I feel that maybe you would for awhile. Just like, it was very obvious when we looked out our window where we had been walking around. We could see for great distances where our footsteps went.

CAPCOM The seismologists are trying to get some feeling for whether or not you thought if there was a lot of rock rolling that might be causing the signals that they see.

SC If there was, it was not evident to us. Most of the rocks that we saw on the sides of craters all had dust around the bottom of them and they - it didn't look like they had moved for a long, long period of time and most of them looked like they were partially dirt, the majority of them looked that way.

SC That's right. Not only that, they didn't seem to look like they thought they were going to roll down in the near future either.

CAPCOM Roger. When you pulled out the core tube, did the holes collapse or did they stay there?

SC That's a good question. We didn't really look down at the rim.

SC I didn't see it either, I was talking to Pete.

SC The tubes themselves stayed pretty dog gone uncollapsed except for the top one or two inches. The minute you draw out the core tube, the top one inch, let's say not two, one inch or so would kind of crumble off and some parts would fall down in, but the sides were still relatively vertical. It is the same thing that happened in the trenches. When Pete would dig the trenches, the sides would be almost 90 degrees except every time you'd tap the sides, say accidentally with this shovel, then that part would get knocked off, but the part that would remain, would still remain 90 degrees. As long as you didn't touch it, it seemed to be happy at 90 degrees.

SC That reminds me of another thing. That pulsed my memory. An impression, but it seemed to me that there were angles greater than 90 degrees in the trenches.

SC It lay in layers and although there wasn't any difference in color, it seems to me that it would imply that there was some layering there and maybe this material is built up over a different time range. If that's really true, you'll see that in the photographs.

CAPCOM Hey, listen, when you deploy the solar wind experiment, did that staff go down into the ground far enough to let the bottom of the foil contact the surface and when you rolled it back up, did all of the foil have difficulty in rolling up or is some of the top section of that roll up smoothly, do you remember?

SC The answer to the first question is it did go all the way down until it touched the soil. It would have I think if we could have pushed it - I pushed on it as hard as I could and then I kind of pushed on it hard enough to lift my feet off the ground and it went down that far which was a foot or so. I can't recall, but I did take a picture of it and you'll be able to easily determine how far it went and that was all the force I could put on it. The answer to the second question is, when it started to roll up, it rolled up about a foot and a half and then it didn't want to roll up any more. It wanted to crinkle. It just didn't want to roll. Okay, so I pulled it down and rolled it up, pulled it down and rolled it up and about the fifth rollup, that crinkle area tore in a longitudinal crack. It just all of a sudden cracked. And I said, oh, oh, things are going to get a little difficult here. So I stretched it out again, I was pretty tender with it all the time, I wasn't being clumsy about it because I had some experience with these foils under vacuum conditions in the chamber and they get awful tender and all the time I was being as careful as I could. So I started to roll it back up again and it started to tear some more so I realized at that time that it was not going to roll up. So, what I did was let it go - let the roller go and swung around a couple of times and then what I tried to do is take - that I took the roller off the staff and held on the roller and I tried to hold one end - hold the roller and just roll it up using the sides.

CAPCOM Apollo 12, we're switching antennas again.

CAPCOM Apollo 12, Houston, do you read me?

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM We lost another antenna switchover.

Al, you were just saying, you held one end of the roller and were rolling the foil back up when we lost you.

SC One - one -

CAPCOM Go ahead.

SC Let me say one other thing about that. That also confirms - I hadn't thought about it either. Remember when the first day, it was just hanging out there like an old window shade. Okay, the second - when we got up the second morning, we looked out there, and I called back and said "Look Pete, those things - this thing has been wrapped around the pole." When I got out there, it had been, but it had taken a definite set. The banner wasn't - the banner wasn't sad as it had been before like a window shade. Sort of had a cata-cornered set in it - not a crease, but sort of a hill running cata-cornered across it at about half the height of the diameter of the staff. So, maybe that aluminum foil under vacuum or whatever the tape is takes to set, it just doesn't want to roll up because the set is stronger than the spring tension.

CAPCOM That certainly could be. Hey, listen, did you take any closeup Stereo pictures outside of the disturbed area and if so, where?

SC We took closeup - oh, I know what you mean. You mean closeups with a camera.

CAPCOM Yes.

SC Yes, we did. I took some near the engine, as I talked about, but I walked out and took some of the bottom of some little craters that we had not walked in. I took some of Pete's footsteps. Three or four of those, but I went out into a couple of areas that we hadn't been and took some photographs. We were not able, because of the time, to really get as many pictures as we wanted - to do as many different things. Since that was the last experiment, that was one that's just sort of separate, and so I - we'll just have to see what we get out of that one. I wasn't particularly satisfied with the way it was at the end, but we'll just have to see what happens.

CAPCOM Roger. That answers all our questions. Let me mention a couple of things that I think you'll find interesting. You were concerned about the dust on the ALSEP experiments. The heatup thermal curves are going just exactly along the predicted lines. So, apparently you guys did just a great job on working on those dusty conditions, because there appears to be no thermal problems on that thing. I guess you've already heard the - some of the results on the passive seismic, when you sent down the lunar module, the whole Mare or at least that area vibrated like a plate for some 35 minutes, and the scientists are really delighted in the kind of data that they're getting out of that. They haven't figured out what it means yet, but they're sure interested in the data.

SC Say, we've been wondering something up here, did you happen to figure out why the LM impacted as far from the seismic experiments as it did?

APOLLO 12 MISSION COMMENTARY, 11/22/69, GET 197:16:00, CST 1539, 594/2

CAPCOM Yes. We had to turn that off from the ground, and there was a slight overburn in getting the signals up there to turn off the computer. The slight overburn dropped it in a little further east than we had programmed it.

SC Okay. We were trying to psych that out up here. Okay, thank you.

CAPCOM Listen, we have a couple of final scores for you. Michigan 24 and Ohio State 12. Missouri 69, Kansas 21.

SC That's good. How about giving our families a call in the next 10 minutes and see what's going on?

CAPCOM As I said a few minutes ago in your -

SC Just a second.

CAPCOM I couldn't catch your wives home a few minutes ago. I'll give them a try again in a second.

SC Okay. Thanks, Don.

CAPCOM There's a luncheon going on over in your neighborhood someplace.

SC Oh, that's right.

PAO At 197 hours 23 minutes, Apollo 12's distance from Earth is 163 401 nautical miles. Velocity, 3 396 feet per second.

END OF TAPE

CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Roger. I just talked to your ladies. Pete, Jane said that Christopher got a bike for his birthday and within an hour after he got it, it had a small accident. He didn't have any problems but the bike is a little worse for wear. He's a little disturbed over that. Also, Peter went with the Allen's up to Elkin's Lake deer hunting. They're supposed to be back tomorrow afternoon so of course, now we have no report on his prowess as hunter and she was particularly delighted with the way the flight's going. She says to really congratulate you on a good flight and they're looking for you back home.
SC Lots of thanks, Don.
CAPCOM Dick, talked to Barbara -
SC Dick's not up right now, why don't you talk to Al?
CAPCOM Okay. Al, talked to Sue. She -
SC Oh, wait a minute he's not - Al - Don, Al's not on it either. Wait a second, I got to get him up on the COM. We're just flouridating water or something.
CAPCOM Roger.
SC He'll give you call in a minute.
CAPCOM Fine.
SC Go ahead, Don.
CAPCOM Roger. Dick I talked to Barbara.
SC No, this is Al.
CAPCOM Oh, okay let's hold off on this, we're about to switch antennae. I'll be back with you in a minute.
CAPCOM Apollo 12, Houston. Okay, Al, Sue reports that they had a real nice luncheon. She went to that this afternoon, the kids of course were home from school and today's a real nice day here in Houston, so they've been having fun around the house and the only other thing is that they're really getting anxious for Monday, to get you guys back down here on the Earth.
SC Thank you, Don. We feel the same way, believe me.
CAPCOM Roger. Is Dick around there yet?
SC Yeh, Dick's up.
CAPCOM Okay, Barbara -
SC (garbled)
CAPCOM Roger.

END OF TAPE

CAPCOM Get you guys back down around the earth.
SC Thank you, Don. We feel the same way,
believe me.

CAPCOM Roger. Is Dick around there yet?

SC Yeah, Dick is up.

CAPCOM Okay. Barbara -

SC He is up playing -

CAPCOM Roger. Barbara reports uncle Herb has repaired all the bicycles and so the kids are really delighted with that. She also reported that the luncheon went off very nicely. Also, Mom and Dad have gone up with Aunt Mary to restock the larders around the house and get all the food they need in the house. Barbara reports the children have been particularly good today and she is very happy over that obviously and they are happy about the flight and really are looking forward to splashdown.

SC Well, so everything is normal around the Gordon household. Thank you, Don.

CAPCOM Roger. We have got some final ball scores for you: Cornell 28 over Penn 14. Penn State over Pittsburg 27 to 7. Pete, Princeton took Dartmouth 35 to 7. Purdue 44, Indiana 21. Notre Dame took the Air Force 13 to 6, and a third quarter score - Tennessee 24 and Kentucky 14.

SC Very good. Let me give you the presleep check list and crew status report is as follows: CDR had one decongestant, CMP had one, and Al had a sleeping pill last night. That's about that - we cycled the fans, chlorinated the water. The valves are all at the proper positions. You have got the E memory dump and the BAT C is 37.0, Pyro BAT a 37.0, pyro BAT B is 37.0 and we are on MAIN A on the DC indicator, and that is about it.

CAPCOM Very good. Hey, listen. A preliminary report on the antenna test shows that the problem is associated with heating. We want to run another test tomorrow in which we hope to pin down exactly which component of the electronics is experiencing that heating. We will brief you on this in the morning but it won't involve much for the crew, mostly just orienting the thing and letting it heat up and making a couple of switch changes, but this probably means that we may slide the second P23 back about an hour, but we will brief you on that change and what the test consists of first thing in the morning.

SC Okay, and I guess the other question is this - do they still plan to do the TV the way we talked about before the flight?

CAPCOM Standby a second.

SC We don't need the answer to it right now. Tomorrow will be fine.

CAPCOM Pete. The plans are to go ahead as briefed before the flight.

SC Okay. Very good.

CAPCOM You guys got anything else for us before you go "beddybye."

SC Don't think so.

CAPCOM Well, have a pleasant nights sleep and we will see you in the morning.

SC The only thing in short supply up here right now is tape recorder batteries. We are on MAX conserve on that right now so we can squeeze the last drop of music out of them. Mike, tell the skipper of that ship to put it right on the center of the target because Dick Gordon is going to be driving it right to that point.

CAPCOM Very good. Say, if you run out of tape music, Have Pete give you some of that "dum de dum dum" stuff.

SC You mean ticky poo and all that jazz.

CAPCOM That's right.

CAPCOM Apollo 12, Houston. The surgeon was wondering if anybody was going to be hooked up on bioharness tonight.

SC We prefer not to. I don't have any on and the other two guys - it is a pain in the neck getting into the bag with all that big cable hooked up. You don't need it for anything, do you? Let me ask this question. How about letting us all just completely unplug and not even get on the radio. If you want us for anything, use the crew alert and we will have the amplifier up and master alarm and it works fine. What do you think about that?

CAPCOM That's fine with us.

SC Very good.

CAPCOM The surgeon will sleep as good as you do with no biomed to watch.

SC That's great. That's good. He may be interested in the fact that we are taking these decongestants but this spacecraft is so loaded with dust - I can't believe it - We have got to clean the screens about 2 hours. What we brought back from the LM must have been the world's record for dust and we have just been having a whale of a time getting this thing clean. I thought it would be cleaned in a matter of 8 to 12 hours, but we have been cleaning screens about 2 or 3 hours apart since we came back from the lunar surface and we are still getting junk off of them.

CAPCOM Roger. All the medical types -

SC Much more so than going out.

CAPCOM The surgeons down here are reviewing their treatment for silicosis so we will be prepared for you.

APOLLO 12 MISSION COMMENTARY, 11/22/69 1559 PM CST, GET 197:36:00 596/3

SC What in heaven's name is that?
CAPCOM That is a miners disease from breathing coal dust.
SC There you go. Okay. I am with you.
CAPCOM Hey, we are going to send up a crew alarm here for you in just a second - a crew alert, excuse me, to check out the system.
SC Okay. Wait until we get the power on - we were just rigging the crew alarm now.
CAPCOM Tell us when you are ready.
SC We are ready. It works real fine, did you hear it.
CAPCOM Yeah, we heard it down here. All right, already. We will rest in comfort.
SC Okay. So will we. Nighty-night.
CAPCOM Nighty-night.
SC Hey, Don. Tell Paul Weitz to have a lively night tonight, will you.
CAPCOM Will do.
PAO This is Apollo Control at 197 hours, 46 minutes. We said goodnight to the crew at 197 hours, 45 minutes elapsed time. Apollo 12 is 162,665 nautical miles from earth approaching a velocity of 3,413 feet per second. As you heard we will not monitor the crew heart rates or respiration this evening and the crew has also disconnected their communication system and if we need to arouse them, we will use the crew alert system, which you heard tested. AT 197 hours, 47 minutes, this is Mission Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 16:09 GET 197:46 597/1

PAO - communications system and if we need to arouse them, we'll use the crew alert system which you heard tested. At 197 hours 47 minutes, this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 16:40 GET 198:18 598/1

PAO This is Apollo Control at 198 hours 18 minutes. We've had no further conversation with the crew since saying good night to them at 197 hours 45 minutes. At present, Apollo 12 is 161 607 nautical miles from Earth. Spacecraft velocity 3438 feet per second. The entry clock has been started here in the Mission Control Center, it shows we're 46 hours 2 minutes away from entry interface, that's from the time the spacecraft reaches 400 000 feet. At 198 hours 18 minutes this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, GET 199:18:00, CST 1740, 599/1

PAO This is Apollo Control at 199 hours 18 minutes. We've had no conversation with the crew, since the rest period started at 197 hours 45 minutes. We're monitoring spacecraft systems by telemetry. All systems functioning normally. Apollo 12 continues to get closer to the Earth. It's now 159 689 nautical miles. Velocity is 3485 feet per second. This is Mission Control, Houston at 199 hours 18 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 1844, GET 200:22 600/1

PAO This is Apollo Control at 200 hours 22 minutes. Alls still quiet aboard the Apollo 12. The crew is some 3 hours into its rest period. Apollo 12 is 157 422 nautical miles from earth. Velocity 3539 feet per second. At 200 hours, 22 minutes this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 1940 GET 201:18 601/1

PAO This is Apollo Control at 201 hours 18 minutes. All's still going well with Apollo 12 as it is now 155 515 nautical miles from earth approaching a velocity of 3585 feet per second. And at 201 hours 18 minutes, this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/22/69 CST 21:37 GET 203:15 602/1

PAO This is Apollo Control 203 hours 15 minutes ground elapsed time. Forty-one hours five minutes until entry. The crew of Apollo 12 still asleep at this time. Scheduled sleep period still runs to a ground elapsed time of 208 hours, about another 5 hours from now. Current velocity 3689 feet per second, relative to the Earth. Distance from Earth, 151 377 nautical miles. Spacecraft weight 25 056 pounds. Things rather quiet here in the Mission Control Operations room. The green team headed by flight director Cliff Charlesworth settled in for the night. At 203 hours 16 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/22/69, GET 20436, CST 2258 603/1

PAO This is Apollo Control 204 hours, 36 minutes ground elapsed time with a position and velocity report on Apollo 12, 39 hours, 44 minutes away from entry to earth's atmosphere. Distance from earth 148 469 nautical velocity in reference to the earth 3764 feet per second. At 204 hours, 37 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/23/69, CST 00:44, GET 206:22 604/1

PAO This is Apollo Control 206 hours 22 minutes ground elapsed time. 37 hours 59 minutes into entry interfaze. Position and velocity reported on Apollo 12, distance from earth 144,597 nautical miles. Velocity now 3,866 feet per second. Crew is still asleep at this time. At 206 hours 22 minutes ground elapsed time, this is Apollo Control.

END OF TAPE.

APOLLO 12 MISSION COMMENTARY, 11/23/69, CST 0201, GET 207:39 605/1

PAO This is Apollo Control 207 hours, 39 minutes. We've had an initial call from Apollo 12. We'll play back that few seconds of tape and rejoin in the insuing conversation live.

CAPCOM Good morning guys.

SC Good morning.

CAPCOM Apollo 12, Houston. Hello Apollo 12, Houston. Over. Good morning 12.

SC Don't tell me we've got Paul on the horn.

CAPCOM Hey, what are you guys doing? You were supposed to let us sleep as long as we wanted this morning.

SC We were supposed to let you sleep as long as you wanted to sleep this morning and I figured - well we woke up a little bit early.

SC Houston, 12.

CAPCOM Go ahead, 12.

SC We'll go ahead and eat now and pick up the O2 fuel cell purge, the waste water and all that stuff on time.

CAPCOM Okay. That's the first update in your flight plan to scratch the O2 fuel cell purge and waste water dump.

SC Scratch. Okay, very well we will.

END OF TAPE

SC Houston, 12.
CAPCOM Go ahead, 12.
SC We got a message we'd like you to send for us.
CAPCOM All righty. Go ahead.
SC All righty. It's to Rear Admiral Davis, Recovery forces, U.S.S. Hornet, Dear Red Dog, Apollo 12 with 3 tail hookers expect recovery ship to make it's pim as we have energy for only one pass. Signed Pete, Dick, and Al.
CAPCOM Okay, Pete, you're breaking up a little bit. I'll ask you to repeat in a couple of minutes and we'll tape it here and then I'll get it off that.
SC Okay.
CAPCOM 12, Houston. Read your message again.
SC Okay, it's to Rear Admiral Davis, Recovery Forces, U.S.S. Hornet. Dear Red Dog, Apollo 12 with 3 tail hookers expect recovery ship to make it's pim as we have energy for one pass only. Signed, Dick, Pete, and Al.
CAPCOM 12, Houston. You're fading in and out. Say again sll after pim.
SC As we have energy for only one pass.
CAPCOM Copy.
SC Signed Pete, Dick and Al.
CAPCOM Copy, Pete.
SC Very good. Thank you.
CAPCOM How's the chow in the ward room this morning?
SC Very good. We're still eating it.
CAPCOM Who's mess cooking this morning?
SC Oh, we're all taking a little turn at it. This is one of the few of them though you can all float above the table pretty nice instead of sitting the chairs beside it. You move up and down and make your selection.
CAPCOM Roger.
SC Houston, we just got our first glimpse of you this morning and there's not very much of you out there.
CAPCOM Well, as you understand, gee, I'm looking at it in the flightplan. There sure isn't, is there?
SC No.
CAPCOM Apollo 12, Houston. Your message is on the way and I got some ball scores if Dick's listening.
SC Yes, he's listening. Go ahead.
CAPCOM Okay, we're still trying to run down the Washington - Washington state results, Dick. In the top ten, Perdue beat Indiana 44 to 21. As you got the score last night I see in the log, Michigan beat Ohio State 24 to 12. And last night USC beat UCLA 14 to 12, so it will be Michigan and USC in the Rose Bowl. Penn State beat Syracuse - Penn State beat Pittsburgh 27 to 7. Stanford beat Cal 29 to 28. Tennessee over Kentucky 31 to 26. Missouri raided on Kansas 69 to 21.

CAPCOM TCU beat Rice 21 to 17. And Houston beat Wyoming 44 to 21.

SC It sounds like they had some wild ballgames down there yesterday.

CAPCOM Yes, they sure did. Hey, for information, how's the gas in your water? Is it all right?

SC Well, the clear water is really quite good. It's been like that all along. And we're still getting a little bit of - still getting a little gas out of our hot water at the crew preparation station. Other than that it's pretty good. We really can't complain about it. It's just a bad system - Oh, it's just as good with or without the gas separators on.

CAPCOM Okay, thank you, Dick. That's the data point we were looking for and how's your cabin temp working using the manual mixer?

SC We didn't touch it last night. The glycol dump temp was holding it about 55 or 56 and we were fairly comfortable last night.

CAPCOM Roger. Very good.

SC We set - we let those safeguarders go in today now. Paul, we are beginning to pick up quite a bit of moisture inside the spacecraft on the hatch structure, both the tunnel hatch and the main hatch, and on the codes at the rendezvous window and down on the bottom bulkhead below the LC bag, but that was to be expected when we're down, right?

CAPCOM Roger. Understand, Pete. Is the water all staying in place or is it drifting around at all?

SC Oh, no, it all stays in place and we're just getting ready - we wiped her down last night and we'll wipe her down again this morning and it's not that bad.

CAPCOM Roger.

SC I guess all that fuel aboard and the LM acts as a reflector and heat sink and we didn't have any going out of course, and now that we're so light and empty, well, I think we've got fueled down pretty good.

CAPCOM Roger, Pete.

END OF TAPE

PAO This is Apollo Control. Apollo 12 now at exactly 14 000 nautical miles out from Earth. Velocity steadily building up 3 991 feet per second. To recap the message that Pete Conrad passed down earlier after they began talking to Mission Control, it was to Rear Admiral Davis aboard the USS Hornet, which is the prime recovery vessel for Apollo 12, in the South Pacific. Dear Red Dog, Apollo 12 with three tail hookers aboard expect to make PIM, or PIM, point of intended movement as we have energy for only one pass. Signed Pete, Dick, and Al. Continuing to monitor as the crew finishes their breakfast and pick up any further conversation.

SC Houston, 12.

CAPCOM Go ahead, 12.

SC What's the look at DIM CC 6 or 7 right now?

CAPCOM Stand by.

CAPCOM Apollo 12, Houston. That a little less than 140 000 miles out on the glide slope, you're looking pretty good. You're on speed Mid-course 6. Right now we're looking on the order of 2 tenths of a foot a second. If 6 is not performed, 7 looks like about 7 tenths of a foot per second.

SC Okay. So what you're telling me is that we're probably won't do 6 and we might pick up on 7, huh?

CAPCOM That's the way it looks.

SC Okay. Very good.

SC Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC Okay. Our crew status report. All three of us got 9 hours of sleep last night. TRP readings across the board, 11029, 1103, 04, 030.

CAPCOM Roger. Copy, Dick. Pete how is that patch on your skin where that censor was bothering you doing?

SC I have a rash where every censor was. They're all doing okay. I was doing what the guys said in Houston that skin cream, but they're not bothering me or anything, but everyone of them that is. But I don't understand it, because I've worn them for this length of time before and never had any trouble, but apparently something reacted this time, maybe they changed the type of paint they used.

CAPCOM Roger. Thank you, Pete. And when you finish eating there and you have the opportunity, I've got some updates, some consumables update and flight plan update for you.

SC Okay. We're ready to copy.

CAPCOM Okay. You're consumables are 208 hours. Your total RCS is 29.2. Reading Alpha through Delta, 30.8, 28.9, 26.9, 30.1. Your hydrogen stands at 29 percent in each

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 02:36 GET 208:14 607/2

CAPCOM tank. Your oxygen is 33 and 35.

SC Okay. Copying all that.

CAPCOM Okay. Now in your flight plan, at 210 hours and 30 minutes. Okay. Commence a charge on Battery Alpha. When you terminate Battery Alpha, we'll start a charge on Battery Bravo and we'll give you a call on that.

SC Okay.

CAPCOM Okay. Now at 213 hours.

SC Okay.

CAPCOM All right. As requested yesterday, we've got new additives for your optics CAL and your P23. At 213 hours, your optics CAL attitude will be 089, 334, and 0. The star will be number 24. Your P23 additive 090 -

END OF TAPE

CAPCOM 090, 329, and 327. Over.
SC Roger. Copy (garbled) about 24 and near angle angles are 039, 324, and 0, VERB 49 maneuver P23 attitude initially is 050, 329, 327.
CAPCOM That's affirmative. Now at 214 hours we're going to slip another high gain antenna test at you.
SC Go ahead
CAPCOM Okay. So with the leaf in your flight plan, start PTC, we'll go the antenna test attitude, which is 050, pitch is 0, yaw is 069. The high gain angles are, pitch, minus 19, yaw, 193, use half a degree deadband. The test will last approximately 4 hours.
SC Okay. 214 start the PTC, high gain antenna test, use a half a degree deadband. Angles are 050, 069, high gain antenna angles minus 19, 193, the test lasts for 4 hours and you'll probably correct us thru that real time.
CAPCOM That's affirmative.
CAPCOM Okay, 12. And depending on when this high gain antenna test complete, which I say is estimated somewhere in the order of 4 hours, when it's complete you'll then pick up your P23, which is presently scheduled at 217 hours into the flight plan. And I got the angles when you're ready.
SC Go ahead.
CAPCOM Okay. Shooting right ahead, here. Those angles and the stars are all the same as the one I read you for 214 hours, Dick.
SC Okay. I suspect this much. Thank you.
CAPCOM Roger. And the same thing at 220 hours.
SC Okay.
CAPCOM And if you're unable to use any of the stars during your P23's, just give us a ground and we've got some alternate stars picked out for you to use.
SC Okay. Thank you. I'll just keep this list I got yesterday. Was it being any good, Capcom?
CAPCOM Stand by and I'll find out for you.
CAPCOM 12, Houston. It was excellent data, the best we've had yet.
SC Okay.
CAPCOM 12, Houston. If you'll give us accept, we'll send up your state vector.
SC Okay. Paul, I got a question on that.
CAPCOM Go ahead.
SC You know the state vector's in there now - you know the state vector's in there now from the P23 you sent yesterday. In the old decent state vector in the LM slot. Are they going to try preserve the P23 stuff, or just write over it. (garbled)
CAPCOM Okay, I'll get an answer for you, Dick.

APOLLO 12 MISSION COMMENTARY, 11/23/69, 02:59 CST, 208:37:00 GET 608/2

SC Houston, 12.
CAPCOM Go ahead, 12.
SC They just started to working down there, so
we can schedule the water pumps to take care of midcourses.
CAPCOM Okay, we'll turn it too.
CAPCOM Hello 12, Houston. We can do it to preserve
your P23 state vectors, Dick, and we can keep it in any slot you
want.
SC Well, it doesn't make any difference. What-
ever you want. (garbled) from the ground, Houston, let me put it
that way.
CAPCOM Yes. okay. We'll do that. They're working
the procedures now. It's going to take a little longer for
this upbreak, about 5 minutes.
SC Okay. Well, call us when you're ready.
CAPCOM Okay.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/23/69, CST 03:09, GET 208:47 609/1

CAPCOM Hello 12, Houston. We are ready to
uplink into the LM slot, Dick and you can keep your P23
vector in the CSN slot.
SC Very good, go ahead.
CAPCOM It's on the way.
CAPCOM No it's not on the way, it will be a
minute while we are switching antennas.
CAPCOM 12, Houston, now it's on it's way.
SC Okay, thank you.
CAPCOM 12, Houston, the computer is yours.
SC Thank you.

END OF TAPE.

CAPCOM Apollo 12, Houston. You guys want some morning news?

SC Yes sir. Send up the morning news.

CAPCOM Okay. First off, among the hundreds of suggestions received by NASA on how to repair the Apollo 12 lunar camera was one calling for the use of a woman's hair pin. I don't know why you guys didn't think of that. From Washington, the -

SC We didn't have the woman.

CAPCOM Laughing. I'll go on. From Washington, the Senate -

SC That stopped you cold didn't it?

CAPCOM Huh?

SC We were looking but we couldn't find one.

CAPCOM Okay. From Washington, the Senate Foreign Relations Committee under Senator Fulbright has decided to go ahead with a series of hearings next month to help the administration determine just what is the wisest future procedure for ending the Viet Nam war. Hearings will be confined to testimony on 9 bills and resolutions introduced by both hawks and doves. In Siagon, gorilla troops, I guess they're VC, ambushed American troops for the 4th time this week killing 2 GI's and wounding 7. Deputy Defence Secretary, David Packard, said that he's very concerned about our casualties and acknowledges US Commanders are sending out smaller units on sweeps. In Los Angeles at the regional headquarters of the alcoholism counsel a telephone installer exchanging phones answered a routine call from a counsel staff member. He pleaded with the guy, "You'd better get over here quickly, I've taken 2 calls and one sounded pretty desperate. I can't talk to you any longer, there's another call coming in." Out of Washington comes word that the new 400 passenger jumbo jet liner will not bring immediate fare cuts until 1974 and beyond according to a CAB staff study. The report cited 2 factors, the high cost of introducing the new airplane and the initial gap between the great number of seats and the amount of passenger traffic available. And from London comes word that a 21 year old man crippled by polio when he was 2 will walk across the United States next summer to raise money for charity. He did this in Great Britian last year and raised \$4800 dollars by walking the length of Britian on crutches. Al, you ALSEP news. Not a hole lot to report this morning. The performance of the central station continues to be normal. The passive seismic is - they're trying to stop some long period Z axis oscillation. LSM is operating satisfactorily as is the solar wind. The sign is still got the high voltages off continuing to operate in the out gas mode. And that's about it from here this morning.

SC Roger. Thank you. Hey, we can entertain

APOLLO 12 MISSION COMMENTARY, 11/23/69, CST 0321, GET 208:59 610/2

SC with a little (garbled) randango.
CAPCOM Okay, go ahead. We got your commercial
this morning.
SC Speedy Al's gone into the sleep mode
to pass time. That's all he does these days is sleep. He's
over in the corner sleeping now.
CAPCOM Well, who's winding the victrola? It
sounds like it's having a hard time running there.
SC We're getting low on Batt power.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 03:65 GET 209:34 611/1

MUSIC
CAPCOM Hey, Pete. Hold the mike a little
closer. We're not reading it very well.
SC MUSIC
CAPCOM There you go.
SC Hey, Paul. We dedicate that song to
Saturn 507.
CAPCOM Okay. Duely noted.
SC And the high tenor was sung by Al Bean.
CAPCOM Yes. I was going to say I thought
that he was sleeping.
SC He gets up every once in a while.
SC Okay, Paul. I have a question on
this CMS entry test. We're on ground test pattern number
2 and I assume that you want to run right on that one. (garble)
seem to type test patterns for entry.
CAPCOM Okay. Stand by. Also will you confirm
your lithium hydroxide canister change.
SC That's been done.
CAPCOM Thank you.
CAPCOM 12, Houston. That's affirm, Dick.
Ah, run it on test pattern number 2.
SC Okay. We're ready to do that now.
CAPCOM Roger.
SC Houston, 12.
CAPCOM Go ahead, 12.
SC The CMS checked out satisfactory.
CAPCOM Roger. Thank you, Dick.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 04:06 GET 209:44 612/1

CAPCOM Hello 12, Houston. Cliff Charlesworth and his green team are going off for the last time. They said say hey and they'll see you in Houston.

SC Very good. We appreciate the fine descent. Sure do. It was lined up perfect.

CAPCOM Yes, he copied that.

SC Yes, I was going to say why don't you save that flight controllers' blast until after the 11 December. I'd sure like to be there.

CAPCOM Okay, that's a promise.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, 04:23 CST, 209:01:00 GET 613/1

SC See if Houston got those torquing angles.

CAPCOM Roger. We got them.

SC Okay, Houston.

PAO This is Apollo Control, Houston, at 111 hours 16 minutes now into the flight of Apollo 12. At the present time, Apollo 12 is 135 659 nautical miles away from Earth. It's present velocity now reading 4115 feet per second. The mission control center in Houston, Pete Frank is now aboard as flight director and his team of orange flight controllers with him at this time. The Capcom position is due to be filled very shortly by Ed Gibson, who is now in the control room and being relieved by Paul Weitz, who is currently on as capsule communicator. We're at 210 hours 16 minutes into the flight continuing to monitor, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/23/69, CST 04:43, GET 209:21 614/1

SC Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC We commenced the Bat A charge at this time.

CAPCOM Roger, Bat A.

SC Morning Ed.

CAPCOM Morning crew.

PAO That's CAPCOM Ed Gibson getting his first morning greeting from the Apollo 12 crew. We are at 210 hours 28 minutes now into the flight of Apollo 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, CST 0506, GET 209:44 615/1

PAO This is Apollo Control Houston at 210 hours, 50 minutes now into the flight of Apollo 12. We presently show Apollo 12 with an altitude of 134 228 nautical miles above the Earth and with a velocity of 4155 feet per second. Flight Director Pete Frank has been going around the Mission's Operations Control room consulting with each of his Flight Controllers and looking ahead planning for today's activities with the Apollo 12 crew. At the present time we're looking for 2 series of P23 navigational star sightings during the upcoming 8 hour shift and the test on the high gain antenna very similar to that performed yesterday. We'll stand by and continue to monitor the air-to-ground loop and at 210 hours, 52 minutes into the flight, this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 05:38 GET 210:16 616/1

SC Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC In case you're watching the DSKY it's a little OJ key for A1 and we won't torque.

CAPCOM Roger.

PAO This is Apollo Control, Houston, at 211 hours 19 minutes. That was Pete Conrad reporting that Al Bean is doing some on the job training with the computer. The DSKY, or display keyboard, presently shows them in program 52 which is a platform alignment. And at this time we find Apollo 12 133 062 nautical miles away from Earth with a velocity reading of 4189 feet per second. This is Apollo Control, Houston.

END OF TAPE

CAPCOM Hello, Apollo 12, Houston.
 SC Go ahead, Houston.
 CAPCOM Say 12, we've got a couple of points we'd like to talk over with you with. Two things on magazines storage and P23's. You got a couple of minutes.
 SC Okay.
 CAPCOM Okay. First of all which magazine was used to photograph Fra Mauro on a LM activation day?
 SC Okay. Ray 1.
 CAPCOM And our second question related to that was - is - was this same magazine - was this the same magazine which failed during the boot strap photography?
 SC No. That we can answer. All of the magazines are marked what they are and Dick doesn't remember off hand which magazine he had Fra Mauro on during LM activation, but he's looking. Let's see. Maybe he has the flight plan.
 CAPCOM We have some folks down here that are pretty interested in Fra Mauro.
 SC The Fra Mauro troops are in on Sunday, huh?
 CAPCOM They have no time limits.
 SC Who do you have down there, Cap.
 Shakey?
 CAPCOM No he's not down here now, but we've got another fellow persuing it for him.
 SC Oh, I see. We'll get it for you, just a minute, we're going to have to do a little digging.
 CAPCOM Okay. Got you, Pete.
 PAO Apollo Control, Houston.
 SC F.
 CAPCOM Magazine F. Thank you.
 SC That's the one that called out for it and that is the one that opened up on us.
 CAPCOM Okay. Understand. Magazine Fox Trot and that is the one that opened up?
 SC (garble)
 CAPCOM Say again.
 SC This magazine Sugar see error.
 CAPCOM Okay. Understand. Fra Mauro is on Fox Trot and Sugar is the one that opened?
 SC Nope.
 CAPCOM Other way around?
 SC Fra Mauro on Sugar. They're all on Sugar and sugar is the magazine that opened up.
 CAPCOM Okay. Thank you.
 SC Now we've got Fra Mauro up and Descartes and Lalaunde for 500 millimeter on another magazine, also. That was the second trip around.
 CAPCOM Okay. Thank you, Pete.
 SC So somewhere along in there we'll get it. And I thought for sure that all the magazine Sugar is

SC ruined by any means, but just didn't want to take any chances.

PAO This is Apollo Control, Houston. The gentleman referred to as Shakey -

CAPCOM You might have to pose a little thought than what deviations from the entry stowage checklist had to be made in terms of pounds and location from folks down here for a reading purposes we'd like to figure that out.

SC Okay. We have stowed everything as far as the boxes go, according to the flight plan and let me mention a couple of boxes to you that has some gear in it, that is not listed.

CAPCOM Okay.

SC In A-8 in the single garment LCG and the uptake, we have all that junk that we brought back from the LM. And now what my suggestion is on the TZ camera off the surveyor and the extra rocks is to tie up in front of the LC bag on the floor in front of A-4 and A-5 rather than on the top of A-1 as it calls out in the flight plan.

CAPCOM Okay, Pete. Do you have any sort of an estimate? Do you have an estimate of the number of pounds for those rocks?

SC The rocks probably weigh 15 pounds.

CAPCOM Roger.

SC What they are are 4 large rocks.

CAPCOM Those are the grapefruits?

SC Yes. They're the grapefruits only.

There was none of those fit - We didn't want to use up all the room in the rock boxes with those big ones.

END OF TAPE

PAO The gentleman referred to as Shaky is Jim Lovell who is not here at this time.

SC To tie that Surveyor camera gear and all that stuff right in front of the L-shaped bag between it and A 4 and 5.

CAPCOM Pete, let us run that one down a little bit and we'll read it back to you.

SC Okay. Another thing is we have the two lunar surface suits, Al's and mine, in the lower part of the L-shaped bag and we have Dick's in the upper part. And what we intend with your concurrence there, is to leave those two lunar suits in the lower part of the L-shaped bag and we'll take Dick's out and tie it on top of Al under the commander's couch. I don't want to take those lunar suits out of the bags. They're so darned dirty, it's just unbelievable.

CAPCOM Okay, Pete.

SC And that's it we don't have any other the other gear, everything stays where it belongs.

CAPCOM Okay, Pete. Do you have any rocks underneath couches?

SC Do we have any what?

CAPCOM Do you have rocks stored directly under couches and if so we'd like to assure that you have at least a 3-inch clearance.

SC Oh, no, we don't have rocks stored there. They're all in the Surveyor, in the big bag that has the Surveyor camera in it, lunar tools, and the extra bag of rocks are all in the one big white bag, if you want to put down in front of A4 and 5.

CAPCOM Okay. And for that you estimated the total weight of that bag is 15? Or was that only the rocks?

SC That's not only rocks. That's got the camera, the Surveyor camera, and your lunar tools that we said we were bringing back.

CAPCOM Okay. Thank you.

CAPCOM Pete, is Dick on the line?

SC Dick talking. How are you?

CAPCOM Okay, Dick. One thing on the P23's, which we have done in the ones coming up. The latest vectors shows angle GAMMA of about minus 6.04, that is based on 14 hours of unperturbed tracking after dumps purge and on valves couple P23. Inaccuracies in our ground vector or projective perturbations to give us this angle. You've already demonstrated the extreme accuracies that you can get using two jets. To avoid projective perturbations and uncertainties in our ground vector, we would like you to use balance couple from here on in your P23's. Also, since the use of unbalanced

APOLLO 12 MISSION COMMENTARY, 11/23/69, 06:23 CST, 211:01:00 GET 618/2

CAPCOM couples perturb the state vector, you have so accurately determined, it will be useful to see how accurately you can do the balance couple P23's.

SC That's something of a pretty good speech.

CAPCOM I've been working on it all morning.

PAO Apollo 12 presently announced an altitude of 131 185 nautical miles. And with a velocity of 4244 feet per second. This is - -

CAPCOM From your VERB silence, I can only conclude that you're working up a comparable speech.

SC Yes. We'll do it. Yea, there's no question about it, do it any way you want to. Sounds like Tonto and (garbled) are having at it again. Wait a minute.

PAO That last bit of guidance passed out by CAPCOM, Ed Gibson, was to do the P23 navigation sighting with four quads and able.

CAPCOM (garbled)

SC Okay.

END OF TAPE

SC This is Apollo 12 position report, we are over 6 feet North, 144.9 West.

CAPCOM Roger, that's looks good to us down here.

SC How could it be, this is my Bat state vector.

SC Are you hitting the needle?

CAPCOM I guess I had better go back and work on that speech again.

SC Now I think the only point that Dick was trying to make and it's a very valid point. Certainly it perturbs the vector, but with that series of marks being (garble) compared with the previous set and so far if you are really doing your own math, adding it all the way down almost to answering it doesn't - that's what we are trying to prove. I think you'll are worrying a little bit too much about preserving the roll vector down there so far out. We all know that doing it with balanced couples, is gonna make it self supporting and it's gonna be more than once. If I was coming home no comm my last worry would be perturbing my own state vector with my advanced eyebrow. I just wanted to let you know you can hear those marks all the way to just before the entry.

CAPCOM Okay, you really think using thermos couples will degrade appreciatively the marks you may be able to get?

SC It does in the simulator so we will find out up here.

SC And here is a good point, we ought to look at it that way, that's what I will be doing, I will be using the same technique. I know it's gonna be a lot harder to do and will take a little longer, but maybe we can prove something by doing it that way. I think it is a good idea to look at it the other way also.

CAPCOM Okay, so far the ones you have done on 2 quad look real good you get our job down here as a P23 instructor.

SC Oh no I won't.

PAO This is Apollo Control Houston at 212 hours 39 minutes now into the flight. Our displays in Mission Control presently show Apollo 12 to be 129,817 nautical miles away from earth. Apollo 12 now traveling at a speed of 4285 feet per second. Relatively calm and quiet in the Mission Control Center, we've had no conversation with Apollo 12 for sometime, however we will keep the line up and will continue to monitor, this is Apollo Control Houston.

END OF TAPE.

SC Houston, 12.

CAPCOM 12, Houston, go ahead.

SC Hey, Ed, I've just been thinking about the nasty accusation you people have been making about my unbalanced couple minimum impulse P23's, and gee whiz, I kind of think it's probably E COMM's water dump that's doing all this to the state vectors.

CAPCOM Just a minute, Dick, we've got E COMM and FIDO wrestling down in the trench. We'll get them apart and discuss it.

SC You don't have to do that, I was just bugging you. Kind of thought something about the vents.

SC What he's telling you is he's getting lazy up here and he doesn't want to work today.

CAPCOM Yeah, but the people down here are talking a lot about dumps we've been having. Maybe that could do it.

PAO This is Apollo Control Houston at 213 hours 14 minutes now into the flight of Apollo 12. Apollo 12 presently 128 356 nautical miles away from earth, velocity now reading at 4329 feet per second. We've been watching on our displays Dick Gordon performing a navigational star sighting program aboard the spacecraft. We've had no conversation with the crew during this period of the past several minutes. We'll stand by and continue to monitor this report. We're at 213 hours 15 minutes and this is Apollo Control Houston.

END OF TAPE

SC Houston, are you getting all this good data?
CAPCOM We sure are.
SC Okay.
SC Hello, Houston, Apollo 12, no storms in this particular one.
SC Have star 204.
CAPCOM Roger, 204 we have an alternate star for you here. (Garble) star 125 near and we'll have a unit vector for you now, 88 when you're ready to copy.
SC Okay, standby.
SC Go ahead, Houston.
CAPCOM 125 is the star, unit vectors now in 88 hours falls, minus .25472 minus .78647 minus .56266.
SC All right, Houston this is 12. Understand star 125, minus 25472 minus 78647 minus 56266 Charlie.
CAPCOM That's Charlie and the magnitude of that is 2.4.
SC Okay. Was that 204 transist the sun or is it about 20 degrees maybe?
CAPCOM That's affirmative. Shaft line is about 6 degrees from the sun.
SC Hello, Houston. Minus 2 on on your star.
CAPCOM Okay Dick, standby. Okay, Dick, let's try star 24 FARR, you have the unit vectors on board. That's at 2.8 magnitude.
SC That was star 24. That's okay, I don't need to reference this. Star 24 was far horizon?
CAPCOM Affirmative.
SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69, CST 7:47, GET 212:25:00 622/1

SC Houston, this is 12. Probably on that first mark I was a little deep into the horizon on that one. I think that's why it came out of that (garbled).

CAPCOM Roger, Pete.

PAO This is Apollo Control, Houston at 213 hours, 35 minutes into the flight. The conversation you hear discussions from Dick Gordon and Ed Gibson at Mission Control are all concerned with the program 23 navigational star sighting effort that command module pilot, Dick Gordon, is involved with at this point in the mission. We presently show Apollo 12 at 127,460 nautical miles from earth. They are traveling at 4356 feet per second. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 2123600, CST 0758 623/1

SC Hello Houston, 12.

CAPCOM 12, Houston. Go ahead.

SC Ed, I'm going to attempt to look at 204 again, and here now and then I can pick up the star. It's so dim that I'm trying to move it out of the horizon and move it along, I lose it in the field of view so I really can't use it for a P23.

CAPCOM Roger, Dick. That - star 125 is really 15 degrees shaft angle from the line of sight of the Sun. I think we quoted your figure as 6.

SC Okay, I still can't see it. I'll call back and give you another opinion or optics cal.

CAPCOM Dick, say again. We didn't copy your last comment.

SC I'll call you back and give you an optics cal.

CAPCOM Roger.

END OF TAPE

SC Okay Houston. There you are.
CAPCOM Okay Dick. Thank you very much. It looks good. Will you hold this attitude for about another two minutes while we finish up on the tape dump?
SC Sure will. We're getting ready to maneuver to the high gain antenna test attitude, but we'll wait - -
PAO This is Apollo Control Houston at 213 hours and 50 minutes now into the flight of Apollo 12. Presently, Apollo 12 at 126 846 nautical miles away from earth, and velocity now reads 4376 feet per second. As you heard, Dick Gordon talking on the loop, Apollo 12 is nearing completion of its first set of navigational star sightings and we'll shortly pick up the high gain antenna test. Meanwhile in the Mission Control Center, the recovery staff support room has recommended to the Flight Director that the USS Austin, in the Atlantic, be released. The Flight Director, Pete Frank, has concurred with this. We are at 213 hours and 51 minutes into the flight and this is Apollo Control Houston.
CAPCOM Apollo 12, Houston. We have this first configuration for the S-band test.
SC Go ahead. We're ready to copy.
CAPCOM Okay. It's the same configuration which we went through yesterday. If you still have that, it's good, if not I'll read it up to you again.
SC I think we still have it, but go ahead and read it (garbled).
CAPCOM Okay. S-band transponder to primary, S-band AUX to tape.
SC Roger.
CAPCOM Tape recorder PCM in LOG, tape recorder, record. S-band antenna, high gain, high gain antenna power ON, high gain antenna Servo Electronics, primary.
SC Okay, we're were all there except for the Servo Electronics to primary and I'm in the secondary transponder and going to primary transponder at this time.
SC Hello Houston, Apollo 12.
CAPCOM 12, go ahead.
SC Houston, 12.
CAPCOM Apollo 12, go ahead.
SC Roger. We're all set now. We've got the transponder in primary, S-band AUX is to tape, TCM interlog in record (garble) high gain power and the Servo Electronics in primary.
CAPCOM Roger.
SC Are you running tape?
CAPCOM Dick, we'll be running the tape if we come up with a problem. We'll have it - we'll be asking you to turn it on when we develop a problem.
SC Okay. Understand. And we're in low bit rate, do you want low or high bit rate.

CAPCOM High bit rate.
SC Okay. All set.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 214 GET 822 625/1

SC Houston; 12.
CAPCOM 12, Houston, go ahead.
SC Roger, while we are in this attitude,
we can run the same test with our GDC, that we ran yesterday
for you. The difference is that we are using the ring 1
needles - ring 1 package at this time for the GDC, and this
seems to be just as bad as the ring 2 system, so if you want
to, we can give you the same check.
CAPCOM Okay, let's go ahead with that Dick;
we're ready to copy.
SC Okay - we're just gonna - we're aligning
the GDC at this time.
CAPCOM Roger.
SC Okay, Houston; we aligned it in ROLL
049.4, PITCH is 000.9, and YAW is 068.6.
CAPCOM Roger; copied 049.4 and 000.9 and
068.6.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 0833 GET 214:11 626/1

CAPCOM 12, Houston.
SC Go.
CAPCOM Would you put the attitude set switch
to the GDC position?
SC Roger.
CAPCOM Thank you.
SC Houston, 12
CAPCOM 12, Houston. Go ahead.
SC I was just going to mention that we've
gotten up to 60 on the glycol evap temp, but I see it's
starting back down now. (garbled)
CAPCOM Roger, Pete.
PAO Apollo Control Houston at 214 hours
15 minutes into the flight. Apollo 12 now at 125 789 nautical
miles of altitude above the earth, presently traveling at
4409 feet per second. At this time, Apollo 12 is proceeding
with the high gain antenna test, the test to place the
spacecraft in attitude hold to obtain the maximum heating
effect on the antenna. We'll stand by and continue to monitor.
This is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 08:53CST GET 214:31:00 627/1

CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM Could we get another reading on those GDC angles,
and then after that we'd like to propose another method in
order to get a little more accuracy. One of the problems
we're having is when your yaw angle gets over 60 degrees we
get a lot of coupling with the other axes, it's difficult for
us to sort it out and get a good hack on what the drift
rates really are. Could you give us those -
SC (Garble).
CAPCOM Okay, if you could give us those readouts now
and then afterwards align the - you can use the align - the
attitude set to 000, using your thumb wheels.
SC Okay.
SC Okay, Houston. The ROLL is 051.1, PITCH is
358.7, and YAW is 069.3.
CAPCOM Roger. 051.1, 358.7, 069.3. Thank you.
SC Read me something using wrong numbers.
CAPCOM Roger, standing by.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69, CST 9:05, GET 214:43:00 628/1

SC Okay, Houston. The angles are 052.4,
003.8, 071.0.
CAPCOM Roger, 0524, 003.8, 071.0.
SC That's right. Okay, we aligned at
000.
CAPCOM Roger, Pete. Thank you.
PAO This is Apollo Control, Houston at
214 hours, 45 minutes now into the flight of Apollo 12.
Apollo 12 continuing to accelerate in its trip towards
earth. Velocity now reading 440 or 449 feet per second, no
4449 feet per second, correction. And at a present altitude
of 124,483 nautical miles above the earth. This is Apollo
Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 0925 GET 215:03 629/1

PAO This is Apollo Control Houston at 215 hours 07 minutes now into the flight of Apollo 12. AT the present time, the Apollo 12 spacecraft is 123 571 nautical miles away from earth, currently traveling at a rate of speed of 4478 feet per second. We've had no recent contact, or no contact for the past several minutes with Apollo 12. However, the crew of Apollo 12 are continuing with their test involving the high gain antenna. We're at 215 hours 08 minutes into the flight, and this is Apollo Control Houston.

SC Houston, 12.

CAPCOM 12, Houston, go ahead.

SC About 3 or 4 days ago, I guess, our number 1 urine filter stopped flowing, so we switched filters, and our number 2 filter just quit flowing, so we're dumping without any filter, and I wondered how long that's going to work. Any good words about that?

CAPCOM Stand by, Pete, we'll try to get them for you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 21513 CST 935 630/1

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM 12, would you start a battery B charge, and also give us a readout on the battery manifold pressure?

SC Okay.

SC Battery manifold 4 A's - 1.5.

CAPCOM 1.5; thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 2153300, CST 0955 631/1

PAO Apollo Control Houston at 215 hours 35 minutes now into the flight of Apollo 12. The Apollo 12 Spacecraft continuing to progress down its path towards Earth. Presently 122 358 nautical miles away traveling at a speed of 4517 feet per second. This is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 216 hours, 5 minutes now into the flight of Apollo 12. Apollo 12 presently 121,046 nautical miles away from Earth. Coming in now at a speed of 4559 feet per second. Capsule Communicator, Ed Gibson, has not contacted the Apollo 12 crew. Since our last report the crew is continuing with its - with the high gain antenna test aboard the spacecraft. We're at 216 hours, 6 minutes into the flight and continuing to monitor.

SC Music, "Sugar Sugar."
CAPCOM 12, we have a little more endurance than that.

SC Music, "Sugar Sugar" continued.

SC R & R time aboard the Clipper.

PAO That was Pete Conrad reporting rest and recreation time aboard the Yankee Clipper.

CAPCOM 12, do you have the sequence camera going?

SC Neg.

SC What's the movie movie in the ward room?

CAPCOM Dick, say again.

SC What's the flick in the ward room tonight.

CAPCOM Dick, we've got one called Lost in Space or After P23's.

SC Are you sending me a - are you sending me a message?

SC Music, "Hey, Little Woman."

PAO P23 is the star sighting navigation program. You heard that rather light hearted exchange.

SC MSFN vector the same degree as mine?

CAPCOM Dick, we're trying to shape up the MSFN vector now.

SC Okay.

SC Music, "Hey, Little Woman" continued.

PAO That music being piped in to the Mission Control Center courtesy of Yankee Clipper.

CAPCOM Dick, was that meant to be post - TLI music?

SC Well, yeah, you might say that.

CAPCOM Hope it's not posted.

SC The (garbled) is in here right now. Well, it's not too bad right now. I guess it depends on where the song originates, huh?

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 10:35CST 216:13:00GET 633/1

CAPCOM Apollo 12, tape recorder to FORWARD and wide beam width.

SC That's just forward, wide beam width. It takes almost ten hours to start - two hours to start that up, doesn't it?

SC It took a little longer time this time.

CAPCOM Apollo 12, could we have the readouts of the AGC and the antenna pitch and yaw angles.

SC Okay. PITCH is about minus 20 degrees, YAW is 190 and the AGC on European clock codes for 12 o'clock it's about 145, in other words, I missed the rain about 3/4 full scale.

CAPCOM Roger, understand. PITCH minus 20, YAW 190 and AGC 45 or about three-quarters scale, thank you.

PAO Apollo Control, Houston. This discussion between Ed Gibson and Dick Gordon on procedures and readings is concerned with the high gain antenna test that's still in progress. We're at 216 hours 24 minutes into the flight. We presently show Apollo 12 at an altitude of 120 193 nautical miles above Earth, and with a velocity of 4587 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/21/69 GET 21625 GET 1047 634/1

CAPCOM Apollo 12, Houston.
SC Go ahead.
CAPCOM 12, we would like you to first of all, dial in a PITCH of minus 60, YAW 240 and then on our call, switch the high gain antenna to manual mode and then to REACQ. And we'll give you a call when we want you to go to manual.
SC Okay - I've got minus 60 and 240 already set up. Waiting for your call.
CAPCOM Apollo 12, would you go to manual mode and then REACQ.
SC Okay - in manual. (garble) read you.
CAPCOM Apollo 12, would you again give us the readings of the AGC and antenna PITCH and YAW.
SC Roger - same as before Ed. Minus 20, 190 about three quarters full scale.
CAPCOM Roger Dick.
CAPCOM Apollo 12, would you switch the high gain to narrow beam? And we'll give you a call in 30 seconds and ask you to read out the same quantities.
SC Roger on the narrow beam.
SC Okay Ed - PITCH looks like its about minus 12, YAW is 180 and the AGC peaked Y6 in narrow; has dropped off now to 3/4ths full scale.
CAPCOM Roger, understand. Minus 12, 180 and AGC peaked and now at 3 quarters scale.
CAPCOM Apollo 12, Houston. Do you observe the antenna still oscillating?
SC (garble) but its gone up to about 56; and the antenna position angles are PITCH minus 20 and YAW 190.
CAPCOM Roger copied. PITCH minus 20 and YAW 190 and do you see any oscillations at all?
SC No, I don't see any at all right now.
CAPCOM Thank you, Dick.
CAPCOM Apollo 12, Houston. Could we have the GDC angles?
SC They are the same Ed; minus 20 and 190.
CAPCOM Dick right now we're looking for the GDC angles - we're finished now with the high gain test.
SC Oh, I'm sorry - I misunderstood you. We'll give them to you real quick here; I think we've got a better GDC on the number 1 package than we had with the number 2.
PAO This is Apollo Control Houston at 216 hours, 33 minutes into the flight. The Apollo 12 crew, specifically Dick Gordon in this case -
SC 5.8, PITCH is 6.7, and YAW is 6.1.
CAPCOM Copied. 5.8, 6.7 and 6.1.
PAO Very shortly, Command Module Pilot Dick Gordon will be involved with more star siting navigation-
CAPCOM Go now to the P23 attitude but we'd like you to roll 180 from that attitude for thermal reasons.

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 21625 CST 1047 634/2

SC Okay.
CAPCOM And would you - be sure that you are
manually maneuvered away from gimbal lock.
SC You bet.
PAO This is Apollo Control Houston - Apollo
12 -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 1057 GET 216:35 635/1

PAO This is Apollo Control Houston. Apollo 12
presently 119 733 nautical miles away from earth, velocity
now 4602 feet per second.

CAPCOM 12, Houston, would you give us S-band
AUX to OFF and tape recorder to OFF?

SC You got it.

CAPCOM Roger.

PAO This last callup concluding the high
gain antenna test. We are at 216 hours 37 minutes into the
flight of Apollo 12.

END OF TAPE

SC Hello Houston, Apollo 12.
 CAPCOM 12, Houston. Go ahead.
 SC Roger. What did you learn from that high gain antenna test?
 CAPCOM Stand by, Dick.
 CAPCOM 12, Houston.
 SC Go ahead.
 CAPCOM Okay 12, we've got a recommendation on the use of that system without the filter. First of all, we recommend you continue to use the overboard line without the filter, and it's possible it may clog. If so, we'll have you dump the waste water down to some quantity, which we'll specify at that time. After that you can install the interconnect line and use the system as before. The interconnect procedure, you will find on ECS 31.
 SC 12, Roger.
 CAPCOM And 12, one note on the stowage configuration, which you specified earlier. That configuration looks to be a good one from our standpoint. We would like to make sure we understand it as you do. We understand you got the Surveyor parts bag, rocks and tools all in 1 large white bag, and that is on the floor in front of the L-shaped bag, and between it and (garble)
 SC (garble)
 CAPCOM Okay, and that's between it and A4 A5, and that this bag is tied down.
 SC That's correct. Okay.
 CAPCOM Your LM gear is in A -
 SC It's not there right now, Ed.
 CAPCOM Okay, but that's where you plan to have it.
 SC Yes, that's right.
 CAPCOM Okay, LM gear is in A8, and Dicks PGA under A 1.
 SC That's correct.
 CAPCOM Okay. It's a good way to go.
 SC Hey Ed, what page did you say the interconnect was on the -
 CAPCOM That's ECS ON 31.
 SC (garble)
 CAPCOM ECS page 31.
 SC Okay. Got it. 31. Is this dumping the waste water through the hatch?
 CAPCOM Negative, Dick. Standby.
 PAO This is Apollo Control, Houston at -
 SC 12, we understand what you're talking about, okay. On the waste water.
 CAPCOM Okay, Dick, that's the first procedure specified on that page.
 SC Yeah, we understand.
 PAO Apollo Control, Houston. 216 hours, 54 minutes now into the flight. Apollo 12 presently at an altitude

APOLLO 12 MISSION COMMENTARY 11/23/69 11:07CST GET 216:45:00 636/2

PAO of 118 870 nautical miles above the Earth.
Traveling at a speed of 46 030 feet per second. This is
Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 1117 GET 216:55 637/1

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM The drift rates you got on package 1
were 3.7 degrees in all axes. We'll be sitting in this
attitude here for on the order of 45 minutes to an hour.
Why don't we go ahead and take a look at package 2 in the
same ways we did package 1?

SC Okay, it's a good idea. You say also
we're delaying the P33's for another hour or so?

CAPCOM That's affirmative.

SC Okay, that's fine with me.

SC Yes, we're not going to go anywhere.

We'll be here.

SC Okay, mark it GDC is aligned on pack-
age 2.

CAPCOM Roger, Dick, thank you.

SC On package number 2.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69, CST 11:27, GET 217:05:00 638/1

PAO This is Apollo Control, Houston at
217 hours and 6 minutes now into the flight of Apollo 12.
The Yankee Clipper is presently 118,334 nautical miles now
from Earth. Velocity now reading 4648 feet per second.
We're somewhere more than 30 minutes away from the start of
our second set of navigational star sightings which will be
performed by Dick Gordon on the Yankee Clipper. Meanwhile
since the Apollo 12 spacecraft will remain in an attitude
hold for this period of time that last message passed up by
Ed Gibson indicates that they will run a drift rate check on
the BMAG package of BMAG standing for body mounted attitude
gyros, one of two packages in the stabilization and control
system aboard Apollo 12. We're at 217 hours, 7 minutes into
the flight, and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 11:37CST 217:15:00GET 639/1

CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM 12 we'd like you to take the waste water and dump to 30 percent at the present time. Your P23 can then be done at 218 30 where - where it should be clear for the sightings and also our temperatures will come back to where we'd like to see them, and the second set of P23s can be done at 220 hours even.

SC Okay, I understand. Take the waste water and dump (garble) to 30 percent. The second set of P23s, do those at 220 and the third set as in the flight plan at 220. Is that affirmative?

CAPCOM That's affirmative, Dick, and you have the attitudes for those onboard.

SC Yes, I sure do and some last information on the waste water dump to 30 percent. Will that give us our 80 percent till reentry tomorrow?

CAPCOM That's affirmative, Dick. That's what we're looking for.

SC Okay, then this should be our last one probably on the waste water, then, okay Rick?

CAPCOM That's right.

PAO Apollo Control, Houston at 217 hours 21 minutes now into the flight. That was Ed Gibson, Capsule Communicator in Mission Control Center, updating Dick Gordon as to ground elapsed times for his navigational star sighting. Presently we show Apollo 12 at 117 652 nautical miles away from earth and traveling at a speed of 46 071 feet per second. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69, CST 11:47, GET 217:25:00 640/1

CAPCOM Hello, Apollo 12, Houston.

SC Hello, Houston, Apollo 12.

CAPCOM Say, 12, you can go ahead and carry out a fuel cell O2 purge for 2 minutes at the present time and you won't have to do an H2 purge either now nor before reentry. This ought to group together all of the perturbations and also will be that last of any dumps or purges that will be required by us. This will make one big happy FIDO down here and ought to just cut down or eliminate anything else we'll require from you.

SC Okay, we'll purge fuel cells with oxygen for 2 minutes on each one, and I'm glad to see you have a very happy FIDO there.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69, CST 11:58, GET 217:36:00 641/1

PAO This is Apollo Control, Houston at
217 hours, 38 minutes now into the flight of Apollo 12. The
Yankee Clipper heading home presently 116,885 nautical miles
away from earth traveling at a speed of 4697 feet per second.
The Apollo 12 crew presently performing 2 items, the waste
water dump and fuel cell purge; and as was described by
Capcom, Ed Gibson, these should be the last of these kinds
of activities prior to return. We presently show we're
26 hours, 43 minutes away from time of entering into the
Earth's atmosphere, and this is Apollo Control, Houston.

CAPCOM Apollo 12, Houston.

SC 12 here.

CAPCOM Dick, we'd like you to go to BRAVO-
DELTA roll in the DAC and we have an RCS consumables update
for you when you're ready to copy.

SC Okay, let me get the DAC first.

END OF TAPE

SC Okay, go ahead.
CAPCOM Okay, GET 217 plus 30, RCS total 29
3131 24 30.
SC (garble) 2173029 total, 21213430.
CAPCOM That's charlie. And Dick on the P23's that your're doing at 217; before you reported you had a problem with star 204, which is your third star listed there, we would like you to take and try 125 over again in its place. That should be about .7 magnitude right or relative than 204. You have the unit vectors for that already, that we read up, or you could find them on page 3188 on the flight plan.
SC Okay, I already have them. It was interesting because I couldn't see star 125 before either.
CAPCOM Okay Dick, if you would, give it a try again this time and if it won't work we'll have another star ready for you.
SC Okay, be glad to.
SC Houston, 12 - was that far horizon or near horizon on 125?
CAPCOM 125 is near.
SC Okay, near, thank you.
CAPCOM Hello 12, Houston. We have a preliminary result of your high gain test.
SC Okay, go ahead.
CAPCOM The up and down link are of signal strength increased by approximately 10 to 12 DB. The data does not show that the beam switching occurred during the problem period. The onboard antenna does show the antenna would move off foresight as though it were tracking and nulling a false error. The tentative conclusion is that since the antenna would operate in the wide beam and react in narrow beam manual, it appears that the foresight shift is caused by a loss of an antenna feed or a comparator circuitry in the narrow beam mode - the strip lines. The high gain malfunction has been isolated to the high gain antenna RF area, thereby eliminating the high gain antenna, the electronic box, and the S-band transponder. The problem appears to be associated with the dynamic thermal operation of the antenna.
SC Ah - thank you.
PAO Apollo Control Houston at 217 hours, 54 minutes now into the flight. That was Ed Gibson passing on the preliminary reading on the high gain antenna test that has taken place in each of the last 2 days. That was Pete Conrad responding. We are now 116 142 nautical miles away from earth, Apollo 12. And Apollo 12 shows a velocity of 47 022 feet per second at this time. This is Apollo Control Houston.

END OF TAPE

SC Houston, 12.
CAPCOM 12, Houston. Go ahead.
SC Hey Ed, what did the boys in the back room
say about that first SEP today?
CAPCOM Stand by on that Dick, and I'll try and get
word up to you.
CAPCOM It's going to take a little while to get a
speech together on this one, Dick.
SC Say again.
CAPCOM It will take a little while to get a com-
parable speech to the last one, together.
SC Don't worry about that, just a good, bad,
indifferent, or useable.
SC (garbled) up here.
CAPCOM Go on Dick, Houston.
SC Hello.
CAPCOM Dick, The sightings themselves that you
took were very good in terms of procedures and from what we
could tell, the accuracy. When you incorporated them into
the state vector, however, we did see a raise in the vacuum
perigee of about 6 miles.
SC Okay.
SC Where - what did this bring it up to, Ed,
about 30 miles?
CAPCOM I think that moves us up to about 27 miles.
SC Okay.
SC Ed, my onboard perigee is 23.2 miles.
CAPCOM Copy. You have 23.2 miles.
SC Thats not on (garble)
SC Thats a negative value of course.
CAPCOM Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 1238 GET 218:16 644/1

CAPCOM Dick, at this time you can maneuver to the P23 attitude and - first, however, we would like those drift check numbers. You can start those P23's and the atmosphere around the spacecraft looks sufficiently clear to take sightings.

SC Okay.

SC Okay, Ed, they are 3.1, 7.0, and 8.3 roll, pitch, and yaw.

CAPCOM Thank you, Pete, that's 31, 70 and 83.

Sc That's correct.

PAO This is Apollo Control Houston at 218 hours 18 minutes now into the flight of Apollo 12. Apollo 12 will be maneuvering now shortly to its attitude to perform the navigational star sightings, this done by Dick Gordon, command module pilot. We presently show Apollo 12 at an altitude of 115 085 nautical miles above the earth and with a velocity reading 4758 feet per second. This is Apollo Control Houston.

END OF TAPE

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Your package 2 drift weights were ROLL 1.9, PITCH 5.9 and YAW 6.8. We've been able - we've calculated your vacuum perigee using your state vector as a value of plus 18.6, we have an entry angle of minus 6.63. Using our state vector we get a value of plus 27 nautical miles and the angle of 6.01.

SC Okay.

CAPCOM And, Pete if you would, would you have Al check his leads on the EKG when convenient, we're not getting a valid EKG reading down here.

SC I'm not sure he's alive. He only comes out every once in a while for a meal.

CAPCOM Well, we want to watch them too.

SC Will you let us know when to stow it?

CAPCOM Well, okay. Go ahead.

SC How's that look, Ed?

CAPCOM Standby.

SC Houston, 12. I have no star for number 1 star.

CAPCOM Roger, Dick. We've got another star here that's 156 and you can find the unit vectors for that on page 3188 on your flight plan.

SC Star number 156.

CAPCOM Affirmative. And Pete, we're still getting some noisy readings from Al's EKG. If you would, ask him to check them again and if they appear unchanged or loose then we'd like him to go ahead and rebound them.

SC Okay, I just checked with Al and they seem to be okay, to me. Is this the same kind of erratic ratings we were getting just prior to going into the LM, or do you think it's some - a sensor problem, do you think it's something connected down below SUP.

CAPCOM It looks to be exactly the same as we've noted before and we think it's a connection problem. Al, clarification on that, it's a connection of the sensor to your skin as opposed to the other connector.

SC Roger.

PAO This is Apollo Control, Houston at 218 hours 33 minutes now into the flight of Apollo 12. Earlier in that conversation you heard Ed Gibson compare onboard and ground navigational readings with Apollo 12. Looking at the present track being made from the moon by Apollo 12, Flight Director, Pete Frank, has indicated that - that it will not be necessary to perform midcourse correction number 6. We presently show Apollo 12 traveling at a speed of 4783 feet per second

APOLLO 12 MISSION COMMENTARY 11/23/69 12:48CST GET 218:26:00 645/2

PAO and presently at an altitude of 114 368 nautical miles less than 4 000 nautical miles away now from that point of equal distance between the earth and moon. That distance being -

SC Our 56 is no good either.

CAPCOM Okay, Dick last one we have worked up down here is 174 and you can find the state unit vector for that on the same page, 188 in your flight plan.

PAO That distance being 10 904 nautical miles. You heard Dick Gordon preparing to begin program 23 a navigational star sightings. We're 218 hours 35 minutes into the flight of Apollo 12 and this is Apollo Control, Houston.

SC Houston, you'll be happy to hear another star this time.

CAPCOM Good show, Dick.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 21839 CST 1301 646/1

SC Houston; Apollo 12.

CAPCOM 12, go ahead.

SC I just took a look at my biomed harness and sure enough, the very same sensor has dried out again, the paste in there. And I'm not able to ease it out this time to replace it with new paste so what I'm going to do is take off my old bio harness and put on a brand new one, if that's okay with you.

SC Roger - that's very good. We'll have a happy surgeon if you do that.

SC Okay, well tell him I'm gonna take them off and it'll take me about 30 minutes or an hour to do it.

SC That's great Al; press on.

PAO Apollo Control Houston. That was Al Bean reporting that he would be switching to a new biomedical harness. The happy surgeon in Mission Control at this time is Dr. John Zieglschmid. We are at 218 hours, 41 minutes into the flight and this is Apollo Control Houston.

SC Houston, 12, no star.

CAPCOM I read you Dick; let's go to 26F.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 GET 2185900 CST 1321 647/1

SC Okay, Houston. There you are.
CAPCOM Roger, Dick, we have it. If you can remain at that optics cal attitude till your next set of P23's coming up in about 1 hour.
SC Okay, fine. Thank you.
SC How about the stars for that next one. Looks like we are going to get some bad ones we know about.
CAPCOM Roger, Dick. We see that. We're working on some and we'll pass them on up to you shortly.
SC Okay.
PAO This is Apollo Control Houston at 219 hours and 6 minutes into the flight of Apollo 12. The Yankee Clipper presently at 112 870 nautical miles away from the Earth, and traveling at a speed of 48036 feet per second. In Mission Control Center, we are now in the process of undergoing a change of shift.
CAPCOM You can terminate BAT B charge now.
SC Roger.
PAO Flight Director, Pete Frank, will soon be replaced by Flight Director, Jerry Griffin. The Capsule Communicator for the Gold Team coming on will be Astronaut Jerry Carr. We're at 219 hours 7 minutes in the flight and this is Apollo Control Houston.
CAPCOM 12, could we have a read out of the battery manifolds before you vent?
SC Houston, its 1.2, and I'm gonna vent.
CAPCOM 1.2. Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 21909 CST 1331 648/1

CAPCOM Hello Dick; Houston.
SC Hello.
CAPCOM That last set of P23's moved us in the right direction; looks as though you're back in perigee now as 23.4 from using your onboard state vector and reentry angle of 6.28.
CAPCOM So it looks as though that set of P23's is giving us good agreement between MSFN and your onboard data.
SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 13:41CST GET219:19:00 649/1

PAO This is Apollo Control at 219 hours 25 minutes.
Apollo 12 is 111 953 nautical miles from Earth. Velocity
4 868 feet per second, spacecraft weight 25 036 pounds.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 CST 1351 GET 219:19 650/1

CAPCOM Apollo 12, Houston. Give us wide
beam width, please.
SC Roger, Good morning, Jerry.
CAPCOM How you doing?
SC Where have you been all day, watching
the football game?
CAPCOM Yes, you better believe it.
SC Which one are you watching?
CAPCOM I just saw the Oilers getting started
with Miami. They're tied right now, 7 to 7. No, it's
10 to 7 now, and I'm kind of waiting for the Rams and the
Cowboys to get started a little later. They start in about
an hour and a half from now.
SC Very good.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 14:01 GET 219:39:00 651/1

PAO This is Apollo Control at 219 hours,
47 minutes. We're about 20 seconds away from the time Apollo 12
will be equidistant from the moon and from the earth. (garbled)
219 hours, 47 minutes, 40 seconds. Apollo 12's distance from
the earth, 110,154 nautical miles from earth, velocity
4805 feet per second.

(HIGH NOISE LEVEL ON THIS TAPE)

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 GET 2194900 CST 1411 652/1

CAPCOM Apollo 12, Houston. We have a flight plan update.

SC Go ahead.

CAPCOM Okay. This is for your P23. It (garble) star number 161 is still good, star number 174 is still good, and 26 is still good for the third sighting, for the fourth sighting change your star to 31-31 far, and I think you have the unit vectors on that already.

SC (garble)

CAPCOM Say again.

SC On star 31, we don't need any unit vectors, Jerry. Okay.

CAPCOM Star number 5 or sighting number 5 is Jupiter, that's still good. Sighting number 6 would be on star 75 near and here's the unit vectors for it. R1 is minus 09871, R2 is minus 79163, and R3 is minus 60298. For alternates we have 24 far and 236 north, correction, near, and the unit vectors on 236 are as follows: R1 is minus 45010, R2 is minus 89075, and R3 is minus 06311. Over.

SC Okay Jerry. I'm sorry, I read you now. I was looking up star 174. I thought I had used that before and it was no good, but I didn't use it, and it was good. Number 1 star is 161 and it's okay, number 2 star 174 and it's okay, number 3 star is 26, number 4 star is 31 and it's Earth far horizon. Jupiter is okay for number 5, and number 6 we're replacing with star number 75, earth near horizon unit vectors minus 09871 minus 79163 minus 60298. Two alternate stars number 24 on the far horizon, and 236 on the near horizon, 236 unit vectors are 45010 minus 89075 minus 06311. Over.

CAPCOM That's affirmative, Dick. Your magnitude on star 31F is 0.2, and the magnitude on 236 near is 3.0.

SC Okay, fine. Just a minute.

SC Thank you.

CAPCOM Apollo 12, Houston. It's Oilers 17, Miami 7.

SC Good go.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 14:31CST GET220:09:00 653/1

CAPCOM Apollo 12, Houston. It's Oilers 22, Miami 7 now. We've got a field goal and a safety.

SC That did it.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 GET 22019, CST 1441 654/1

PAO This is Apollo Control at 220 hours, 22 minutes. Apollo 12 distance from earth now 109 270 nautical miles, velocity 4964 feet per second.

SC Houston; 12.

CAPCOM 12 Houston, Go.

SC Roger Jerry - No star is visible for number 6 or 75 near the horizon. Which would you rather have me use - 24 or 236?

CAPCOM Stand by a second.

SC Say again.

CAPCOM 12, Houston.

SC Go ahead.

CAPCOM Roger - they want to check your unit vector again on star 75; they didn't see it come up in the last register.

CAPCOM As best we can tell, you ought to be able to use 75.

SC Well, the best I can tell, I can't.

CAPCOM Okay, stand by a second.

CAPCOM 12 Houston; recommend you use 24 far, over.

SC Okay.

PAO That was Dick Gordon who is performing some onboard navigation exercises.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 14:54 GET 220:32:00 655/1

SC Okay, Houston. It's all yours.

CAPCOM Roger, 12. You should be going to the PTC attitude now, and I've got some procedures for you for photographing that hatch window contamination when you're ready to copy.

SC Okay, Jer, stand by.

CAPCOM Okay.

SC Go ahead, Jerry.

CAPCOM Roger, Dick. The best way to take these photos is with the sun incidence angle at about 45 degrees, and at PTC you'll get this angle when you roll with either 215 degrees or 290 degrees, and the procedure you use is essentially the same as we did on the way out you know when you took pictures of windows 1 and 2. They need to have you clean the inside pane and then set your Hasselblad with the 80 millimeter lens with black and white film and take 2 photos at F delta 5.6 at 12 50th and a focus at 3 feet and then change your F stop to F4 and take 2 more photos. Over.

SC Okay, Jer, we got all that, and we'll get that done.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 15:15 GET 220:53 656/1

CAPCOM Apollo 12, Houston.
SC Go.
CAPCOM Roger. In your - going into PTC, we recommend that you disable quads CHARLIE and DELTA and select OMNI BRAVO for us and we'll take care of switching for you. On your high gain antenna, would you turn off your power and we'll leave it off until time for TV and then get it up again. And just a reminder, during the TV portion, looks like you're going to have to limit your - your views to interior because the sun being pretty near to being behind the Earth like it is, we're afraid that if you try to take a look at the Earth with the camera, you're liable to zap it in the sunlight. And looking ahead to 221:30, we would like you to do that P52 that's planned on there but as things stand right now, looks like there'll be no midcourse number 6 and we'll probably do a midcourse number 7. Over.
SC Okay, understand.
CAPCOM Good enough and has Dick got any comments on the results of the last P23? It looked pretty good down here.
SC He says no.
CAPCOM Okay.
SC Good up here.
CAPCOM Roger. Final score on that ball game was Houston 32, Miami 7.
SC Very good, Jer, thank you.
SC Houston, 12.
CAPCOM Go ahead, 12.
SC Earlier they reported that we weren't going to do anything more from the ground in the way of purges. Does that mean that we're going to skip this H2 purge?
CAPCOM That's affirmative, Pete.
SC Okay.
PAO This is Apollo Control at 221 hours. Yankee Clipper is now 107 452 nautical miles from Earth. Velocity, 5031 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 221:03:00, CST 1525, 657/1

CAPCOM Apollo 12, Houston. You can start your
PTC.
SC Okay.

END OF TAPE

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Pete, we just uncovered a problem on the TV program that's scheduled. We come to find out we have a terrain masking problem on Goldstone and the TV start - stop times that we've got for you right now are too early. What it boils down to is we can't start TV until 224 10 and with your concurrence we'd like to run the TV show between 224 10 and 224 40 and that means stopping your PTC at 223 50 and I've got some attitude angles and high gain angles for you. And so what you'll do is stay in PTC a little longer and get all your pre sleep checklists out of the way and have it all done so that we can run this TV show - the Press Conference that we've got for you here and then as soon as we're finished with that, we can just shut her down and you guys can head for the sack.

SC Very good. It's fine with us.

CAPCOM Okay. If you're ready for - -

SC We're having a hard time, Houston. We're having a hard time using all that 10 hour rest period these days.

CAPCOM Okay. If you're ready to copy, I've got your times and attitudes and everything for you.

SC Okay. We're ready to copy.

CAPCOM Okay. We're on page 3-191 where it says maneuver to TV attitude change 223 15 to 223 50. And your roll is 340 pitch 270 yaw 0. Your high gain angles are pitch plus 190 and yaw 270. And in this attitude you'll have window No. 1 looking at the earth and window No. 5 looking at the Moon. And as I mentioned before, your TV then will now be from 224 10 to 224 40 and let's move this - and go ahead and get this pre sleep checklist done early. And we've got your - the questions that I'll be reading up to you on this Press Conference submitted by the Apollo 12 press corps. and that's about it Pete.

SC Okay. Very good.

PAO This is Apollo Control at 221 hours 33 minutes. The new start for the TV pass 224 hours 10 minutes is 6:32 PM Central Standard Time, 6:32 PM Central Standard Time and it will be a 30 minute TV pass. At present - -

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23, 69 1556 PM CST, GET 221:34:00 659/1

PAO And it will be a 30-minute TV pass. At present Apollo 12 is 105 801 nautical miles from earth. Velocity, 5093 feet per second.
S/C Houston, do you have those torquing angles?
CAPCOM 12, Houston. Affirmative. We have got your torquing angles.
S/C Okay. That Dick Gordon is getting pretty fancy in PTC, isn't he?
CAPCOM Pretty slick.
S/C A few more days and I will understand it.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 22204, CST 1626 660/1

PAO This is Apollo Control at 222 hours, 4 minutes. Apollo 12 is 104 273 nautical miles from earth. Velocity has increased to 5152 feet per second.
PAO This is Apollo Control at 222 hours, 9 minutes. We'll recap the television situation for you. Television transmission has been delayed for 55 minutes from the scheduled time, originally scheduled for an elapsed time of 223 hours, 15 minutes, now scheduled at 224 hours, 10 minutes. The reason for the delay is that terrain features near the Goldstone tracking station will mask out the signal at the earlier scheduled time and we will not receive a suitable signal for television until the 224 hour, 10 minute mark that is equivalent to 6:32 PM central standard time. Apollo 12 now 104 015 nautical miles from earth. Velocity, 5162 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 16:46 GET 222:24 661/1

SC Houston, Apollo 12. We're going to be working with our TV camera inside and so we're going to take out our S-band FM transmitter group 1 circuit breaker.

CAPCOM Roger, 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 222:44:00, CST 1706 662/1

PAO This is Apollo Control at 222 hours 53 minutes.
Apollo 12 distance from Earth 101 864 nautical miles. Velocity,
5246 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, CST 1756, GET 223:34 663/1

CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Roger. Got a few ball scores for you.
SC Go.
CAPCOM Roger. The Rams beat the Cowboys
24 to 23 in a real squeaker of a game that just finished.
The Raiders beat the Chiefs 27 to 24 and Vikings 52
Steelers 14. That pretty well covers it for today with
the TV ballgames and you already know the score of the
Oiler, Miami game.

SC Roger. Thank you.
CAPCOM Okay. And another item - wanted to
just review with you the format for today's TV show. In
this particular little News Conference bit, you're going
to be asked questions that were submitted by newsmen, right
here in MSC. That's the news staff that's been here covering
the flight. Now most of the questions that are going to be
read up to you will be exactly as submitted by the newsmen
and they'll be in an order of priority specified by the news
media.

SC Okay.
SC We're going to stop in about - oh -
2 or 3 minutes and - at 340 roll.
CAPCOM Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 1806 PM CST GET 223:44:00 664/1

PAO This is Apollo Control at 223 hours,
50 minutes. Apollo 12 is now 98 927 nautical miles from earth,
velocity 5364 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 2235400 CST 1816 665/1

CAPCOM Apollo 12, Houston.
SC Go ahead, Houston.
CAPCOM Roger. On that high gain antenna you
can go ahead and just go to reacq narrow beam and let's wait
and see what happens. If it goes sour on us, we'll have to
go manual.
SC Okay. It's in reacq narrow beam now.
CAPCOM Okay and we're getting you 5 by right
now.
SC Okay.
CAPCOM Apollo 12, Houston, with some more
football scores for you.
SC Go ahead.
CAPCOM Roger. New Orleans 43, San Francisco
38; San Diego 45, Denver 24; Detroit 16, Green Bay 10; Cleveland
28, New York 17; Baltimore 24, Chicago 21.
SC There's a few interesting ones in there.
CAPCOM Didn't copy that, Dick. Say again.
SC There's a few interesting ones in
there.
CAPCOM That's affirmative.
CAPCOM The Saints are looking pretty good.
CAPCOM 12, Houston. One more score. Phila-
delphia 34, Saint Louis 30.
SC Like I said, a very interesting day.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69, CST 1826, GET 224:04 666/1

PAO This is Apollo Control at 224 hours
4 minutes. We're within 5 - 5 1/2 minutes from the start of
this TV pass. Apollo 12 is 98 213 nautical miles from earth.
Velocity 5394 feet per second. On your television monitors
in the news center you may notice a bouquet of roses on the
Flight Director's console. Those were received a short time
ago here in the Mission Control Center from a family in
Montreal, Canada.

SC Houston, Yankee.
CAPCOM Clipper, Houston. Go.
SC We're ready anytime you are.
CAPCOM Okay. We're checking out our lines.
We'll be right back with you.
SC Okay. We're sending.
CAPCOM Roger.

END OF TAPE

CAPCOM 12, Houston, we're copying you.
CAPCOM 12, Houston. You look great but you're upside down.
SC Had to turn the camera - camera over, that's the only way we could mount it.
CAPCOM Okay.
SC Look like a bunch of bats hanging from the ceiling.
SC That's what (garble) will do for you.
CAPCOM 12, Houston. Stand by a couple of seconds here, we're going to try to flip the picture.
SC Okay.
SC The fourth guy holding the camera doesn't understand English so we can't get him to turn it around up here.
CAPCOM Would you believe that we can't flip it?
SC Okay.
CAPCOM About the best we can do is flip black and white but the color has to stay where it is.
SC Okay. Well, let's see what we can do.
CAPCOM 12, Houston. We're getting our usual excellent quality picture.
CAPCOM Looks very good, Pete.
SC Okay, I guess we're ready, if you're right side up now.
CAPCOM Real fine, Pete. It looks good. We can see all three of you. We see Al Bean flipping in on the side there. First of all, I'll read you a little statement then we'll start off with the questions. The questions that you'll be asked at this news conference have been submitted by newsmen here at the Manned Spacecraft Center who have been covering the flight. Some of the questions they raise have been answered in your communications with Mission Control, but the public at large has not heard them. The questions are being read to you exactly as submitted by the newsmen and in an order -

END OF TAPE

CAPCOM - your communications with Mission Control, but the public at large has not heard them. The questions are being read to you exactly as submitted by the newsmen, and in an order of priority specified by them. So, here comes question number one. If you had this mission to fly over again or were planning another with your present knowledge, what would you do differently and what equipment would you add or modify specifically in connection with the EVA? Over.

SC Well, I think we'd work over all the tools and the tool carrier, and the bags. I think we'd work over just about all of it. I think it was very good, and I think it operated very well, seeing that we'd never been there before and attempted to do that kind of work. Now that we've done it, I think we can make some improvements on it. Now, I'll let Al talk about it.

BEAN I think that you about hit it, Pete. I think the PLSS's and the OPS's and the suits, as far as the operation of both EVA's were - you couldn't ask for anything better than that, to prove that it even worked.

CAPCOM Okay, troupe, here comes -

SC Hey, Jerry.

CAPCOM Go ahead.

SC If I had it to do over again, I'd of waghered a little more with all those people who said I would never be able to find the LM on the lunar surface. In fact, if I'd of been that smart, I'd have bet them on the Surveyor also and I'd retire.

CAPCOM Roger, Dick. Okay, here comes question number two. Was there some confusion about something you said yesterday about the launch into the thunderclouds? Would you or would you not consent to launching under those conditions again?

SC I'd go again.

SC We did it this time; why can't we do it again.

SC Me too.

CAPCOM Okay, troupes. Question number three - aside from the lightning, what gave you your most apprehensive moment, if any, either before the lunar landing, during your time on the Moon, or afterwards, and if you never had an apprehensive moment, was there ever a time that you may have been a little bit concerned over all that was going on?

SC Well, from the liftoff all the way through the GET of 224 hours and 14 minutes 30 seconds.

SC Yes, that's a pretty good answer. I think clearly all three of us were a lot calmer through most of the flight than I thought we'd be or any of us thought we'd be except both Al and I were a little bit nervous about ascent. After that we only got to have one engine. I think we were a

SC - little peaked there right towards T0 on liftoff through the ascent stage. Once we got going and was doing so well, that really didn't concern either one of us after that.

SC I'd like to tell them, all I can think of was one time when we were walking around on the lunar surface the second EVA, I felt my suit pressure kind of pulse. That PLSS is so good that you never feel any change of pressure as you walk around or move around or jump up and down or anything else. This one time it did, and I took a quick glance at my suit pressure gage that I thought maybe it was building up or decreasing. I had some sort of problem with it when I had the OPS, but it wasn't the gage. It was just right, and that was the end of it. The only time it occurred either, but that gave quite a pulse there for a second.

SC Well, I think when we switched to the command module side of the house, Jerry, everything has gone according to plans and as expected. I think that the best thing about my end of the operation just that there hasn't been any surprises. I'd like to think that anyway.

CAPCOM Yes, that's kind of nice. No surprises. Pete, now question number four is for you. Out there on the Moon, you sounded happy even euphoric. Some people think that maybe you were on an oxygen high. Were you, and for both you and Al, how did it feel subjectively to be out there?

SC I was very happy, but I wasn't on an oxygen high. I was very happy because all the work that we had put into that EVA was beginning to pay off. Once that we got over the initial stumblingblock of the one little problem we had getting the fuel cask going, why I was quite happy because we were on the timeline, everything was going the way we thought it was going to go, and I was just having a ball because it was much easier than all the one g practice we've done learning how to do that.

END OF TAPE

S/C - night and everything was going the way we thought it was going to go and we were just having a ball because it was much easier than all the one g practice we've done learning how to do that. Yeah, you asked about how it feels - I think for about the first 10 minutes that you are out, at least in my case, you find that it is not as hard as you think it is going to be to move around and you are pretty happy about that but you could sense that first 10 minutes you want to be careful and you don't want to over extend yourself, so you are sort of excited trying to get up to speed, get your balance in good shape, and get your movements in good shape so you can start doing the work and once the first 10 minutes is over, then you sort of realize that you now know how to hold your balance and you are not going to fall down and everything is working real well. I think right then you start getting down to the operational part of it and after that you just press on to get the job done, like Pete said. I was in a good humor to start with seeing we had landed next to the Surveyor. That started the thing off right.

CAPCOM Okay. Question number five. On Apollo 11, Armstrong and Aldrin had to curl up in the corners of the LM to sleep and complained that they were cold and uncomfortable. You had hammocks and blankets. How did you sleep and on the subject of sleep, a lot of people are wondering whether you dreamed there on the moon.

S/C Well, let's take them all in order. In the first place, we didn't have any blankets. We had the hammocks and as you may or may not remember about a week before the flight we found a problem on the boot on my backup suit and all four of our suits were sent back to the factory and the boots were replaced and in the process of doing that the suit had to be rerigged when they came back to the Cape and I had to fit my suit without the liquid cooled garment because both the flight ones were already packed you can't put a nonflight one in a flight suit and I had the legs then a little bit too tight, so in my hammock that night I didn't want to take my suit off, it was too dirty in there. In my hammock I was very uncomfortable, my shoulders - the suit was pressing on the bottom of my feet and my shoulders and it sounds funny but in bending your knees or anything you can't get rid of that. If the suit is too short, it's too short, it was about 1/2 inch too short. So I bared with it most of the night and I only slept about 4 and 1/2 hours, mostly on account of that, and then Al, very kindly, the next morning,

S/C let my suit out for me and - which took about an hour and that is about how I spent my night. Then as for the dreams, I don't dream normally anyhow that I can remember, and I didn't dream there. I didn't dream either and I don't know, I didn't sleep too good on the moon. Not because we were cold or hot, because we weren't - we had both the liquid cooled garment on and we had air running through our suits and so if it got a little warm, we could either turn on the water pump and get a little cool water running through your suit, and rapidly cool you down, or turn on the air and get a little air running through your suit to cool you down. So using those two controls, I think Pete and I stayed just about the temperature we wanted to stay. The hammocks were very comfortable. It is interesting that if you rig them on the earth and they are pretty long and you say - boy, when you get in that it really is going to sag but when you get on the moon you only weigh about 30 or 35 pounds and you get in those hammocks, I was looking at Pete up on his, you don't hardly sag a bit. You just kinda lay there almost horizontal. A real comfortable place to sleep.

CAPCOM Roger, Al. And you didn't dream either, huh?

S/C No, I didn't dream a bit. I woke up and went back to sleep a number of times. Another interesting thing, people have worried about the amount of sound in the LM bothering you. It is fairly noisy in there and there is a couple of pumps that change frequency every once in a while, but all in all, I don't think that was any hinderence to sleep, do you, Pete? No. The one-sixth g is nice, it just keeps - it pushes you down enough so that you feel pressure on your back or your side or where ever you are laying but it is not enough to really give you any pressure points in the suit. I think one-sixth g is a lot nicer than either zero g to sleep in or one g to sleep in. It is a good happy medium. It is pleasant.

CAPCOM Roger. Question number six is for Dick Gordon. Dick, how does it feel to be alone for a day and a half in orbit around the moon and what were you able to observe of Pete's and Al's activities on the surface -

END OF TAPE

CAPCOM And question number 6 is for Dick Gordon. Dick, how did it feel to be alone for a day and a half in orbit around the Moon and what were you able to observe of Pete's and Al's activities on the surface? Also when the LM was crash landed after rendezvous Friday, were any of you able to see the impact?

GORDON Well, it's a little hard to really express how one would feel being away from Pete and Al for a day and a half out there being very close and then being left alone to tend the Command Module in lunar orbit while they're down there for some 32 hours of a lunar stay. I'd thought about this before and yet - what would it be like to be completely alone on the back side of the moon with no contact with any other human beings, but suprisingly enough the activities were such I was awfully busy during my waking hours and didn't have time to dwell upon that. And to be perfectly frank so blasted tired at the end of the day, that I could hardly get to bed fast enough to get enough sleep to carry on the next day's activities which were busier themselves because of the photographic requirements that were levied on while in lunar orbit while Pete and Al were working on the lunar surface. I never did observe them personally on the surface but I did see the LM on the optics which are right behind us, and I also saw the Surveyor in the crater. I saw both of these objects twice on 2 different passes. One pass I put the camera on the sextant hopefully I'll have pictures of that so my doubting friends will no longer doubt. All in all I think that kind of describes the activities that I went through while Pete and Al were down on the lunar surface. The last part of your question Jerry I forgot what it was. Would you repeat it again?

CAPCOM That's about the crash landing Dick. Did you see it go in?

GORDON No. None of us saw it go in. After we separated I tracked the LM for a considerable length of time in the optics and thought I had a pretty good state vector so that the auto optics would track the LM automatically. Therefore I put the camera, the same camera on the sextant right here behind me hoping that it would automatically track the LM into the lunar surface. I don't know whether we were successful with that or not. I have some doubts about that. Certainly none of us saw it with the naked eye.

CAPCOM Roger Dick. Thanks. Question number 7. You mentioned during the EVA finding three kinds of soil. Will you give a brief description of each. It's color, it's texture and so forth and discuss what ever problems you had

CAPCOM in handling all the different kinds of lunar material?

SC Well, when we say three different kinds of soil yesterday that was I guess what I want to say is a subjective thing in that the colors are all the same. It appeared that some soil was firmer than other soil in the manner in which you sunk into it. And the finer soil with the - the softer soil that we sank deeper into was of a finer grain. This was over towards the very extreme end of our traverse over the Sharp crater which is about as far away as you could get away from the LM. And now we have samples in the sample bags some of this type of soil. When I say three different kinds of soil the medium textured one was where we landed on one side of the Surveyor crater. And over on the other side when we went down to get to the Surveyor we found the ground was considerably more firmer. It appeared to be firmer ground not quite as - you didn't sink in quite as much as we did over working around the LM. Then when we got over to the Sharp crater which was the far end, that's the softest ground, we sank in the deepest there.

SC Do you have anything to add to that, Al?

SC Oh no you covered it. They asked about the color.

SC One of the real difficult things about the whole EVA - the geology part of it was the fact that it didn't appear to be any difference in color upon either the rocks or the soil. They all looked about the same. The first day, to me, they all looked sort of a dull gray. And I think I described most of the rocks that way, as a dull gray. The soils a dull gray and this sort of thing's a dull gray. And if you look so close at first you could see maybe a - -

CAPCOM Apollo 12, Houston. We might break

END OF TAPE

SC - that is, the soil is a dull grey, this sort of thing is a dull grey and if you look sort of close, of course, you can see maybe -

CAPCOM Apollo 12, Houston. there's a break, you'll have to go manual on your high gain antenna. We just lost you.

SC Okay.

CAPCOM Okay. We're getting you back now, Pete. Press on.

SC Well, on the rocks, the soil looks sort of a grey and if you look real close maybe you can find a white rock now and then or you could maybe disturb something and get a little darker grey, but they were grey. The second day we went out the same thing that looked grey to us the first day, started looking, at least to me, started looking a sort of a brown, dark brown or a tannish brown and it was really one of the most interesting things of the lunar surface operations, was how much that color can change just with a 7 degree or so sun angle change and how everything there changes color with it. When we came upon the Surveyor, you recall, it was grey, I mean it was brown. We saw it the second day, it was brown and we asked you if it had been painted that way and you said no, it hadn't been, it had really white. When we got up next to it, we discovered sure enough it looked brown and the coating on it was the same brown as the soil. Now, I wouldn't be a bit surprised that when we get all those parts back to Houston, they don't turn out to be, you know, under the earth light and light of the laboratory, turn out to be kind of dark grey again. It is going to make geology quite a bit more difficult than we see it on earth because the color cues just aren't going to be there and you are going to have to look for texture and fracture and luster and lots of other things that will aid you in determining differences in rocks and minerals.

CAPCOM Roger. Let's move on to the next question there. No. 8, were the moon's color, texture and general appearance as seen from above as you expected them to be and is there any place on earth you know of that looks like the Ocean of Storms?

SC No. I can't think that there is. It reminds me of desert areas. You might be able to find appearance like that in some deserts, particularly the back side of the moon, which is lot more beat up than the sun side. As far as the Ocean of Storms, I guess there really isn't any correlary any one place on earth that I recall, at least.

CAPCOM Okay. The next question is for Pete. Pete, everybody is wondering about that fall you took on the

CAPCOM moon. Was it accidental or on purpose, and how did it feel to fall in the weak lunar gravity and could you have recovered your footing if Al Bean hadn't been there to help you?

SC Yes. I didn't fall on purpose. I was trying to pick up something and I was just standing next to Al. It was a rock that was too big to go into the tongs and we sort of had a little game we played there of leaning on tongs and sort of doing a one-arm jabber-do all stretched out and I just sort of rolled over on my side down there on the ground and Al, before I got all the way down, just gave me shove back up again. I don't think it'll be any problem. The business of falling against a rock and cutting your suit. You don't fall that fast. You just wouldn't hit a rock hard enough. You think, Al.

SC I don't. Not only that, you're talking about not falling fast. When you start, if you lose your balance at first, particularly if you ever try to back up, because the ground is uneven and you're stepping over, over rocks, you fall so slowly that it gives you plenty of time almost to turn around, or catch your footing before you actually get low enough down before it's too late. I can recall a number of times when I lost my balance. If I'd lost my balance that much on earth, I would have probably fallen down. Now, on the moon since you start moving so slowly, you're usually able to spin around and bend your knees and recover. And, like you say, Pete, you're falling so slow that you can catch yourself and roll over or something.

SC I think that's another thing. I saw Al do this two or three times also, and in trying to bend over to get something, we'd start to fall over and you fall so slowly that you just start -

END OF TAPE

SC - or something.

SC I think that's another thing. I think I saw Al do this two or three times also. In trying to bend over to get something, you'd start to fall over and you fall so slowly that you just start moving out and you just keep moving until your feet come back up under you again. So it's not that easy to fall over up there for that matter. And I really don't think there's any problem.

CAPCOM Roger. Question number 10 I think you've pretty well answered but I'll read it anyway and you can add any more thoughts you might have to it. While you were inspecting the Surveyor spacecraft down there in the crater, you commented about changes in it's appearance, the white part seemed to have turned tan and so on. Will you discuss this further and give us any impressions or conclusions you may have about what caused these changes.

SC Well, this brown color is definitely some lunar dust that's on it and it was evenly distributed all the way around it so I don't think it's dust that we blew on with the LM while we landed. I think it's accumulated there. It wasn't that easy to wipe off. And the other thing I think that was most apparent to Al and I were in cutting the tubes in practice, we had, and I'm going to have to check this but theoretically we had the same aluminum tubing as the struts were on the Surveyor and the tubing appeared much more brittle and much more easier to cut it and so I suspect there's a crystallization or something had happened to the metal in the 31 months it was sitting there and the other thing was that we noticed that the wire bundles that we had to cut the insulation had gotten very dry and very hard and also very brittle. And I think that's about it. Can you think of anything else, Al.

SC No, I think you've covered it, Pete.

CAPCOM Okay, here comes number 11. Do you think that future EVA's can be extended beyond the four hour limit, or do you believe the number of four-hour EVA's should be increased in order to get more exploration done on each mission?

SC I think you ought to go a longer time on each EVA. We felt badly sort of that we got shut off the other day, although we didn't have the data in real time, we had an agreement with the ground that we weren't going to go past the four hours but we had six hours worth of consumables and we'd gotten out early on the second EVA. And as far as being tired or anything, we weren't tired we were, we could have kept on going, we hustled to get back just to make our four hour deadline. And I think that the big problem is getting suited up and getting unsuited when you get back in. Doing the work outside is easy. Once you step down the ladder you're on your way. And I think what you should do is get a long

SC pair of PLSS and if you have a three-day LM you have a PLSS that'll stay on for 8 or 9 hours and some way to give a guy a drink of water and maybe a shot of food he can sit down and take a little siesta out there for a half an hour in the middle of it and he can do an 8-hour day work out there and that's the big, the big thing is getting it all on and getting out and getting it all off and putting it all away when you get back in.

SC Here's another significant problem Pete didn't mention. That's the amount of dirt that you bring back in the spacecraft with you. Most things now, although they had been in the LM for a certain considerable length of time before they got back into the command module, still brought back a tremendous, just a tremendous amount of dirt and dust in our clothing and on their persons and I think that if you're work in an environment for any length of time, you're really going to have to tackle this problem and keep it clean.

CAPCOM Roger, thank you. That was a good one. Question number 12. For future lunar explorations, is a geologist a desirable member of the crew and what sort of surface transportation would you recommend?

SC Well, you can go pretty good on your feet, I can tell you that right now. I guess we ran almost a mile out there without giving it too much thought. Certainly I think a geologist should go on the trip. I'll tell you one thing, though, it took every bit of knowledge I had to get that baby down there in the right place. That was no easy task and I think - as a matter of fact we were discussing that earlier today. I'm a big advocate of the LLTV, I think that was a tremendous help to me and I - certainly that's been my profession and it took everything I had to get that LM down in one piece. I think that well, we've got some things to work out on that that'll make those tasks easier and I think that the ideas to get the transportation system worked out and then take the necessary people to go.

END OF TAPE

APOLLO 12 MISSION CONTROL, 11/23/69, GET 224:37:00, CST 1859, 673/1

SC I think that the idea is to get the transportation system worked out, and then take the necessary people to go. There's no doubt that geologists can do a better job than I can. I'm not a geologist.

CAPCOM Roger, Pete. This is the last question now. Millions of people who stayed up late one night last week are wondering what happened to that T.V. camera anyway?

CONRAD Well, Jerry. We really don't know what happened to it. All I know is that you told me that you were getting a picture and then I didn't pay any more attention to it until I heard you talking with Al, and we don't know what happened to the camera. But we have it onboard. We brought it back with us, and whatever is wrong with it, they'll find out and have it fixed so that have good T.V. for 13.

CAPCOM Roger, Pete. That covers all the questions we have. Do you have any general nature little goodies you'd like to show us or talk about?

CONRAD Well, is George Low down there by any chance?

CAPCOM Pete, he doesn't seem to be in the mock or in the viewing room, but we know that he's listening.

CONRAD Okay, well, he could probably see it later, but he sent us a letter about not having a certain passenger aboard the spacecraft and unfortunately he isn't with the spacecraft and we just wanted to show it to George so that he could write the proper letter to allow him to have made the flight.

BEAN I've got something to say. Pete, Dick and I spent -

CAPCOM Roger. You found him, huh?

CONRAD We sure did. He was in the food locker.

CAPCOM Is he fat?

CONRAD He's very fat.

CAPCOM Go ahead Al.

BEAN Pete, Dick, and I spent a couple of years getting ready for this mission. Both backing up Apollo 9 and working on this one. We spent a lot of time sitting around thinking about what our chances were of actually getting to the Moon and landing there, and coming back home. There weren't any space missions, it boiled down, as you know, Jerry, it boiled down to about 3 big things. One, you've got to have trained people that operate the spacecraft, and that operate on Earth as flight controllers, and we felt pretty good about that. We've been training hard. We've worked with flight controllers. We knew that they had. You've got to have a good set of procedures to work by and people like Bill Kindle and the men that work with him, that spend many long hours, and a heck of a lot of effort developing them. We were pretty happy about that too. That leaves the hardware. The machinery that's got to work. The Saturn V and the command module and the LM, and that was sort of a big unknown. We knew that there were

BEAN - millions and millions of parts in here, and it doesn't take very many parts to go bad before you can - abort a lunar mission. It's a long chain of events, and any one of them can shoot you down and cause you to come back home early without making it. We, of course, couldn't wander around and check all the parts on any of these things, because we don't know that much about it. We did know the people that worked on it though. People like Jim Harrington at the Cape, and Buzz Hello there, and Chuck Tringali, our team leader, and a lot of others that I didn't mention right then. We kind of felt pretty good about the fact that they were handling the gear. We're on the way home now. We'll be back tomorrow and every bit of this machinery has worked beautifully. We've had a couple of small failures, but none of the equipment that we worried about has shown anything but perfect performance. The fuel cells, for example, are just perking along. Just beautifully as they can. They're putting out 20 amps a piece. Holding they're own just perfectly. I think that this is a fantastic tribute to the people that designed this equipment, and the people that built it, and the people down at the Cape that checked it out. I'm pretty proud of Apollo 12 mission. We got everything that we've supposed to do done. I hope that all of those people there, that had anything to do with this hardware, that built it, that designed it, or that checked it out feels as proud about this mission that I do.

CAPCOM Roger, Al. I think that I can speak for everybody down here when I say that we're all darn proud of it ourselves. I think that all of our little mascots, Snoopy, and BC and the rest of them have really done their jobs well in helping us keep the mission before the people and keep everybody motivated.

SC We got - we got -

END OF TAPE

SC We've got one last thing to say and
then we'll close.

CAPCOM Roger. Go ahead.

CAPCOM Pete, while you're making preparations,
the family is here in the MOCR viewing you.

SC Good.

CAPCOM WE've got you on the big, big screen.

SC Great, tell them we'll be home in about
a week.

CAPCOM Roger.

SC We wrote a little inscription over the
SPAI and signed it.

CAPCOM Roger. Try focusing in just a little
bit. We can almost read it. It says "Yankee Clipper with
Intrepid in tow -

SC It says, "Yankee Clipper sailed with
Intrepid to the Sea of Storms, Moon, November 14, 1969".

CAPCOM Roger, we can read it now. Thanks.

CAPCOM And we copy the signatures.

SC And that's it, Jerry, for Apollo 12,
good night. We'll be talking to you tomorrow morning.

CAPCOM Roger. We'll be seeing you.

SC Good night.

CAPCOM Apollo 12, Houston.

SC Go ahead.

CAPCOM Roger. We got all that state vector
for you. Would you like to just load it in the LM slots, or
do you want to take it the way it is?

SC I don't know. Is it any different than
what I've already got?

CAPCOM It is a little different.

SC Jerry, I'll take it anywhere you want
to send it to up here. (Laughter). (Garble) the P-23 slot
would do.

CAPCOM Okay. We'll just put it in the LM
slots and preserve the P-23 for now.

SC Okay. You can stuff it into any slots
you want to.

CAPCOM Roger, Babes.

CAPCOM 12, Houston, for PTC this time. Disable
BRAVO and CHARLIE.

SC Roger.

CAPCOM 12, Houston. We're going to have a
MCC-7 pad for you and an entry pad and then we'll read a
preliminary pad which will be updated later.

SC That's what we like to hear - that
entry pad.

APOLLO 12 MISSION COMMENTARY, 11/23/69, GET 22442, CST 1904 674/2

CAPCOM Roger.
SC Stand by, Jerry, we've got to get a couple of books. We may even have to manufacture a couple of pads.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/23/69 1909 PM CST GET 224:47:00 675/1

S/C Go ahead with that preliminary P30 pad, Jerry, and I will copy it down.
capcom Stay by just a second Pete, we are still scratching it out.

S/C Okay.
CAPCOM Apollo 12, Houston. Through an ACCEPT, and we will start the upplan.

S/C You got it.

CAPCOM Here she comes.

CAPCOM Apollo 12, Houston. I have your maneuver pad midcourse 7 ready.

S/C Go.

CAPCOM Roger. Midcourse 7. RCS G&N. NOUN 47 is 25036 N/A N/A. 241215333. NOUN 81 minus 00060 all zips plus 00002. ROLL, PITCH, and YAW are - all zips 310 all zips. NOUN 44 is N/A N/A. DELTA VT 0006101300061. SEXTANT 112414397. FORESIGHT 044 UP 013 LEFT 50. The rest is N/A. Comments, Sirius and Rigel for GDC align. ROLL is 336. PITCH 262. YAW 357. Ullage is four quads plus X. Under other we assume entry IMU alignment. Over.

S/C Okay, Jerry. 25036 N/A N/A. 241215333. Minus 00060 all zips plus 00002. 000310000 N/A N/A 0006101300061 112414397 044 UP 013 LEFT 50. (Garble) Sirius and Rigel the stars. 336 262 357 4 quads plus X. And assume entry IMU alignment.

CAPCOM That's affirmative. We will have your entry pad in just a couple of minutes.

S/C Okay. We are ready when you are. Jerry, the weatherman told me before the launch that it was going to be clear with scattered clouds, 10 miles of of zids, and a very weak cold front was going through that was very dry, and I hesitate to ask the preliminary weather in the recovery area.

CAPCOM We will give it to you if you really want it.

S/C Yeah. Go ahead and give it to us, will you.

CAPCOM Okay. We will scare it up. We have it all written down somewhere here. While you are waiting, I have a few more football scores. These are American League.

S/C Yeah. Go ahead and send them up.

CAPCOM Okay, Dick. New York Jets 40 - Cincinnati 7. Boston 35 - Buffalo 21. And back to National - Washington was 27 - Atlanta 20.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 1919, GET 224:57 676/1

CAPCOM 12, Houston with the weather. This is based on a forecast on 23 November at 1100. The weather will be 1800 scattered variable broken, high scattered 10 miles. The winds from 120 at 15 and the seas are four feet.

SC Okay. Thank you.

CAPCOM Apollo 12 Houston with an entry pad.

SC Go.

CAPCOM Roger. Entry pad. Midpact is the area 000 151 000. GET for the horizon check is 2440521267. NOUN 61 is minus 1582 minus 16516062 NOUN 60 36116649 1167936197. RRT is 24422210029. NOUN 69 is all NAs. V cir 4000210001903230804, sextant 232946290 boresight 016 UP 147 left 11 lift vector UP. Comment 1 assumes entry IMU alinement. Comment 2. Assumes midcourse 7. Over.

SC Roger. Copy 000151000. 2440521267 minus 1582 minus 16516062 361166491167936197 24422210029. NA for the next 4 slots. 4000210001903230804 232946290016 Up 147 left 11 UP and the 2 comments are assume entry IMU alinement and MCC 7. Agree?

CAPCOM That's affirmative. Got a few other goodies here for you. When you start up PTC we'd like you to do it with QUADS BRAVO and Charlie disabled and a couple of switches for your COMM system. Your FM transmitter group 1 circuit breaker should be CLOSED and S-band aux TV switch OFF and then go ahead and power down your high gain antenna and give us OMNI BRAVO. And a quick reminder, your state vector is now loaded in the LM slot and your P-23 is still in the CSM side.

SC Okay. We've got all those switches set and we're going to give you OMNI BRAVO right now.

CAPCOM Roger.

SC Houston, 12.

CAPCOM Go ahead 12.

SC What's the midcourse adjusting for?

CAPCOM Stand by for a second. We'll check.

CAPCOM Apollo 12, Houston. The reason for the midcourse is that you're a little bit shallow and we want to steepen it up. Right now we're looking at a flight path angle of 5.77 and a perigee of 30.

SC Okay.

SC Say Jerry. Earlier today, I asked to take off my sensors so that I could replace them with some new ones because they weren't working properly and I took them off and one of them is sort of broken out like

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 1919, GET 224:57 676/2

SC Pete's. What I liked to do, if it's
okay with the surgeon, is leave the sensors off tonight and
when I get up tomorrow morning real early, I'll put the
whole new set on and maybe they'll have the biomed for
reentry and see if they think that's okay?

CAPCOM Roger A1. The surgeon concurs on that.
They'd like to watch the CMP tonight for the sleep period
and the other two guys in the bags can go without.

SC Sounds good.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 19:29 GET 225:07 677/1

CAPCOM Apollo 12, Houston. We're handing over from Madrid to Goldstone in about 20 seconds.

SC Okay.

CAPCOM 12, Houston, through Goldstone, how do you read?

SC Loud and clear.

PAO This is Apollo Control at 225 hours 10 minutes. Apollo 12's distance from Earth now 94 762 nautical miles. Velocity 5540 feet per second. In this preliminary PAD -

CAPCOM 12, Houston. Looks like all we need from you is your presleep checklist data and we'll leave you alone.

SC Okay.

CAPCOM 12, Houston. We think -

SC Are you ready for E memory dump?

CAPCOM Just going to tell you we're ready.

SC One minute.

CAPCOM Roger.

SC Okay, the command module RCS injector temps are 4 point 2 for 5 CHARLIE, 4 point 0 for 5 DELTA, 3 point 6 for 6 ALPHA, 6 BRAVO is 4 point 4, 6 CHARLIE is 3 point 4 and 6 DELTA is 4 point 6. BAT C is 37, PYRO BAT A and PYRO BAT B are both 37. The CDR and CMP both had lung decongestant today and the LMP had one sleeping pill last night. We can't chlorinate the water, we have no buffer left. So I don't think that makes any big deal. And everything else is per checklist.

CAPCOM Roger, Pete.

SC See you in the morning.

CAPCOM Roger, 12. We copied your E mod. This by the way guys is the last shift for your friendly gold team and gold flight and all of us on the team are mighty proud of you guys and we felt we'd like to let you know it. We'll see you back here at the ranch in a few days so take care and don't take any VOLTERS.

SC Roger, roger. We appreciate it. A great job from you guys, thank you.

PAO This is Apollo Control at 225 hours 13 minutes we have said good night to the Apollo 12 crew. This preliminary PAD that we sent up for midcourse correction number 7 calls for an ignition time of 241 hours 21 minutes 53 seconds. Magnitude of the maneuver 6 point 1 feet per second. It would use the service module reaction control system with a burn time of 13 seconds. This MCC 7 PAD will be updated. The final PAD will go up to the crew about 2 hours prior to the maneuver and these figures could change some by that time based on the tracking between now and then. Some of the more significant items in the preliminary entry PAD that we passed

PAO up and this PAD will be updated tomorrow too prior to entry but a preliminary - on the preliminary PAD that we passed up it shows entry interface at 400 thousand feet at an elapsed time of 244 hours 22 minutes 21 seconds. Velocity predicted at that time 36 116 feet per second. At blackout would begin 19 seconds after entry interface, blackout would end 3 minutes 22 seconds after entry interface. Drogue chutes deployed 8 minutes 4 seconds after entry interface. Main chute deployed times are not included in that preliminary pad. We also show expected maximum g forces during entry of 6 point 2. Targeting for a landing point coordinates 15 point 82 degrees south latitude 165.16 degrees west longitude. At 225 hours 16 minutes this is Mission Control Houston.

END OF TAPE

PAO - about the two-action control system quads for the passive thermal control, here's that tape now.

PAO We apparently have some technical difficulty with that tape in the sound room in the news center. It was merely a callup from Jerry Carr reminding them to disable two of the - here it comes now.

CAPCOM Apollo 12, Houston. No need to answer me, but you need to get quads BRAVO and CHARLIE off.

PAO And that was the sum total of the call and we have monitored on telemetry the fact that the crew has disabled those quads. Apollo 12 now 93 951 nautical miles from earth, velocity 5575 feet per second. And the entry clock showing 18 hours, 56 minutes remaining until entry into space. This is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/23/69,GET 226:09:00,CST 2031,679/1

PAO This is Apollo Control at 226 hours 9 minutes. We just put in a call to the crew to ask them to chlorinate water. Here's their conversation.

CAPCOM Apollo 12, Houston. Apollo 12, Houston.
SC Go ahead, Houston.

CAPCOM Roger, guys. Sorry to wake you up, but we're concerned about the chlorine situation. We'd hate like the dickens to see you guys get stuck with an extra 20 days in the quarantine because of it. The status down here now - we'd like you, if you've got chlorine, to go ahead and chlorinate the water - chlorinate it even if you don't have the buffer. The thing is that you ought to do it now, so when you get up in the morning, it'll taste reasonably good enough so that you can handle it.

SC Okay. Consider it done.

CAPCOM Roger. How about CMP, is he hooked up to biomed?

SC Yes, do you have it on?

CAPCOM No, we sure don't.

SC You don't, huh. Houston, 12.

CAPCOM Go, 12.

SC Houston, 12.

CAPCOM Go, 12.

SC What are we supposed to use as a buffer for that chlorine?

CAPCOM 12, Houston. The surgeon says that you won't need a buffer. If you put it in now, and let it sit all night then disseminate into the water, that it won't be too bad in the morning.

SC Okay. Hey, Jerry. I fell asleep here and left my suit power and AUDIO off, but I've got them back on now.

CAPCOM Okay.

SC You see my heart?

CAPCOM We got you loud and clear.

SC On the way over there?

CAPCOM You'd better believe it is. It's petty patting right down the line.

SC I'm just getting lazy.

CAPCOM You made the surgeon's whole night.

CAPCOM Good night, guys.

SC Good night, Jerry.

PAO This is Apollo Control at 226 hours 12 minutes. We said goodnight to the crew again for the second time. We don't anticipate having to call them again. The surgeon decided, however, he did want the water chlorinated even though there was no buffer left in the spacecraft for the chlorination process. We wanted to have it done now, so that by in the morning the water would be palatable for the crew. Apollo 12 is now 91 354 nautical miles from Earth. Velocity, 5690 feet per second. At 226 hours 13 minutes, this is Mission Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 2040 PM CST GET 226:18:00 680/1

PAO This is Apollo Control at 226 hours, 18 minutes. The crew has just called us to report they have found another bag of the chlorine buffer in the spacecraft and will use that in connection with the chlorination process. Here is the tape of that conversation which has just been concluded.

S/C Houston, 12.

CAPCOM Go ahead, 12.

CAPCOM Apollo 12, Houston. Go ahead.

S/C We have a third bag of this stuff -

about everything.

CAPCOM Good show. We figured that was probably what had happened, Pete. We were thinking if you talk to us again, we were going to tell you where everything was stowed and see if you could find it.

S/C Well, we thought we had two bags and we had three.

CAPCOM Roger. See you in the morning.

S/C Roger. Nighty-night.

PAO So now for the third time we have said goodnight to the Apollo 12 crew. The last time - elapsed time of about 226 hours and 18 minutes. Apollo 12 now 90 971 nautical miles from earth, velocity 5707 feet per second. 18 hours, 1 minutes to entry interface. This is Mission Control, Houston, at 226 hours, 20 minutes.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 2142, GET 227:00 681/1

PAO This is Apollo Control at 227 hours 19 minutes. We've had no further conversations with the crew in the past hour. Apollo 12 is 87 654 nautical miles from earth. Velocity, 5861 feet per second. The Change of Shift News Conference will begin at 10:30 PM Central Standard Time in the Houston News Center and at that time, the latest entry information will be available. At 227 hours, 20 minutes this is Mission Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/23/69 CST 22:22 GET 227:59 682/1

PAO This is Apollo Control at 227 hours 59 minutes. Apollo 12 is 85 411 nautical miles from Earth. Velocity, 5970 feet per second. Flight director Jerry Griffin and the gold team is in the process of turning over their duties here in the Control Center to flight director Glynn Lunney of the black team. CAPCOM on the new shift will be astronaut Don Lind. Change of shift news conference scheduled to begin at 10:30 p.m. central standard time in the Houston news center. Participants will be the flight director Jerry Griffin, the CAPCOM Jerry Carr, and the retrofire officer Charles Deiterich. At 228 hours, this is Mission Control Houston.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/23/69, CST 23:40, GET 229:18 683/1

PAO This is Apollo Control at 229 hours 18 minutes. Apollo 12 presently 80 837 nautical miles from the earth, traveling at a speed of 6201 feet per second. Flight Director Glynn Lunney at present is reviewing the mission status with his Flight Controllers and checking out events for today's re-entry and splashdown. The crew still has about 5 hours left in their scheduled rest period, the flight plan calls for the crew to be awakened at 234 hours ground elapsed time. All systems on the spacecraft continuing to function well at this time. At 229 hours 19 minutes, this is Apollo Control Houston.

END OF TAPE.

APOLLO 12 MISSION COMMENTARY, 11/24/69, 00:44 CST, 230:22:00 GET 684/1

PAO This is Apollo Control at 230 hours 22 minutes. It's now been some 4 hours since we last heard from the crew about 226 hour 18 minutes. This sleep period scheduled to end some 4 hours from now at 234 hours. At the present time Apollo 12 is travelling at the speed of 6412 feet per second, and the distance from Earth is now decreased to 76 949 nautical miles.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 01:40 GET 231:18 685/1

PAO This is Apollo Control at 231 hours 18 minutes. At the present time the crew is about 3 hours from the scheduled end of their sleep period. The spacecraft continuing to function normally. We're reading a cabin pressure of 5.1 pounds per square inch, which is normal. Cabin temperature has been running in the low 70's. The base digitals show the spacecraft to be traveling at a speed of 6614 feet per second at the present time. Altitude 73 421 nautical miles from the Earth and the flight surgeon reports that Dick Gordon, the only crew member on whom we have biomedical data at the present time, is sleeping soundly. At 231 hours 19 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 02:04 GET 232:18 686/1

PAO This is Apollo Control at 232 hours, 18 minutes. We now have less than 2 hours until the scheduled wake up time for the crew. All spacecraft systems continuing to function well. There has been no change in any system status since the last report. It's been a very quiet shift. The spacecraft presently traveling at a speed of 6 848 feet per second. The altitude has just dropped below now the 70 000 nautical mark. We're now reading 69 598 nautical miles from the Earth at this time. At 232 hours, 19 minutes, this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69, CST 0340, GET 233:18 687/1

PAO This is Apollo Control at 233 hours, 18 minutes. We're now 55 minutes away from the scheduled crew wake up time. Apollo 12 traveling now at a speed of 7110 feet per second and our distance from Earth is decreased now to 65 617 nautical miles. We've had a very quiet sleep shift here. During most of the night the activity is centered around watching spacecraft systems, reviewing the status for today's splashdown. This is Apollo Control at 233 hours, 19 minutes.

END OF TAPE

PAO This is Apollo Control at 234 hours 2 minutes. About 15 minutes ago, we got some indication that at least one of the crew was awake and we've seen data here indicating that they are operating the DSKY, their spacecraft computer and our communications engineer reported just a few moments ago that the crew has configured their spacecraft communications for voyage down length. So we will be standing by for a call from the spacecraft, the sleep period is not officially scheduled to end for about 11 more minutes. We also have a weather report from the primary recovery area in the mid Pacific forecast at end of mission calls calls for scattered clouds at 1800 feet, waves of 4 feet with 5 foot swells, winds out of the East, Southeast at 5 knots. Visibility of about 10 miles, also predicted scattered showers in the recovery area. At present time we show the spacecraft some 62 500 nautical miles from the earth, traveling at a speed of 7330 feet per second. We will stand by now for a call from the crew. We don't expect CAPCOM Don Lynn to be putting in a call to the crew for about 10 more minutes.

SC Hello Houston, Apollo 12

CAPCOM Good morning, Apollo 12.

SC Good morning, good morning. We are just getting cleaned up and eating breakfast.

CAPCOM Very good. Are you ready for the big day?

SC I don't know, what's happening?

CAPCOM Oh, we've got a nice little section in the South Pacific reserved for you. And we have most of the Navy standing by to pick you up.

SC Good. We've cleared certain area of all altitudes, huh?

CAPCOM That's affirmative.

END OF TAPE.

SC Houston, Apollo 12.

CAPCOM Go, 12.

SC Yesterday, I gave my tentative storage arrangement and I'd like to modify that just one little bit, and I'll appreciate it if you'd let retro know. Instead of storing Dick's suit under the left-hand couch, we have some garbage in the PSD and we'd like put that in the hatch bag. And it's all soft. And then we'd like to take Dick's suit and stow it under the right seat and that's the only change.

CAPCOM Roger, Copy.

SC Thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 05:04 GET 234:42 690/1

Dead Air

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 05:34 GET 235:12 691/1

SC Houston, we stopped PTC for a moment to do some photography and we'll get back in it again in about 10 minutes.

CAPCOM Very good. When do you plan to do a P23? Will you do that before you -

SC Say again.

CAPCOM Do you plan -

SC Say again, Houston.

CAPCOM Do you plan to do the

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 05:44 GET 235:22 692/1

SC - - Houston

CAPCOM Do you plan to do the P23 while you're out of PTC before you reenter?

SC We might as well, let's see, unless we're doing it just a few minutes early. We'll hold to 236. You want to do that?

CAPCOM Stand by. Okay. We're okay for early and we have some attitudes for you when you're ready to copy.

SC Okay. I'll be back with you in a minute for the attitudes.

PAO This is Apollo Control at 235 hours, 31 minutes. We have just had a report from the radiation support room that our solar partical alert network has detected a very small solar flare. The - We haven't gotten a description of the size of the flare except that it was quite small and at this time we have gotten no readings from instrumentation on the spacecraft to indicate the presence of any additional level radiation as a result of this flare. At the present time the -

END OF TAPE

PAO - radiation as a result of this flare.
At the present time the spacecraft is traveling at a speed of 7825 feet per second. Stand by, here's a call from the spacecraft.

CAPCOM Roger. We'll get it for you momentarily and in return can you give us a sleep and PRD readup.

SC Roger. Across the board 88 1/2, 8 1/2 11032, 11032, 04034.

CAPCOM Thank you. Okay, the RCS total at 233 hours is 25.5, Alpha is 26.3, Bravo is 26.6, Charlie is 23.0, Delta is 26.2, H2 total is 21.9 percent, O2 total is 27.7 percent.

SC Copied all that, thank you. Houston, 12. Ready to copy those angles.

CAPCOM Roger. The P23 optics calibration attitude, roll 89, pitch 334, yaw 0. The optics calibrations star is star 24. P23 sighting attitude, roll 87, pitch 329, yaw 316, for the 4th star substitute star 24 far horizon. Don't, if unable to use this star go to the next star in sequence. No alternate stars will be updated and please report the types of difficulty with any stars omitted.

SC Okay, P23 bore sight optics calibration 0893340, star 24 and P23 attitude 087329316 and for star 4, substitute star number 24. No alternate stars. Please report difficulty within the star sight.

CAPCOM That's affirmative and with star 24 it's the far horizon.

SC Yeah, I got that, bare to far horizon.

CAPCOM Apollo 12, Houston. One flight plan change for you when you want to copy.

SC Okay, go ahead.

CAPCOM At 238 hours and 30 minutes the report of the command module RCS injector valve temperatures, delay that report to 240 hours and that will then improve our chances of not having to do any feeding.

SC Okay. I just looked at them right now and over the night during the PTC they're all above 4 lobes, some just barely and so we will have gone back into PTC for awhile after the PGNCS attitude you gave us. We'll probably be in pretty good shape.

CAPCOM Roger, thank you, Pete.

SC We have until - we have until (garbled)

END OF TAPE

PAO This is Apollo Control at 235 hours 43 minutes. The flight surgeon reports that the personal radiation dosimeter readings passed out to the crew or passed down by the crew indicate no significant increase in radiation levels. The increase over the past 24 hours is about 30 millirads per crewman and this is about what we have been running for a 24 hour period. At the present time Apollo 12 is 55 277 nautical miles from the earth, traveling at a speed of 7896 feet per second.

CAPCOM Apollo 12, Houston. We would like you to give us the high gain antenna if you would, we would like you to turn the power on, give us wide beam width, react mode. The pitch angle is minus 79 and YAW is 156.

SC Coming at you.
SC There you go, it's all locked up.
CAPCOM Thank you. You want to leave it in wide.
SC Do you want to leave it in wide?
CAPCOM That's affirmative.
SC Okay.

END OF TAPE.

SC Houston, Apollo 12.
CAPCOM Go ahead, 12.
SC Okay. Would you check with the boys in the backroom. We're not happy having any trouble with Jupiter, as far as seeing it or not I can't see it. Do I have a right vector?
CAPCOM Roger. We're checking.
SC This is a surprise to me. I didn't think I'd have trouble seeing Jupiter.
SC Hello, Houston. 12. It's all right. I got it now.
CAPCOM Very good. That gives us a lot of comfort to realize they're all still up there.
SC Why should that be comforting to you? What if you missed one? Would we be here.
CAPCOM Oh, we don't mind if we miss a star, but it's all the planets out there, you know the astrologers are really bent out of shape.
SC Well, being there and seeing is two different things.
CAPCOM Roger.
SC Houston, Apollo 12.
CAPCOM Go, 12.
SC Don, star 75 is not visible.
CAPCOM Roger. No 75.
SC And Al just found star 24.
CAPCOM Roger.

END OF TAPE

SC Don, one of the problems I've had now with this is that star is so dim that when I get it down on the air glow it almost washes out too much and I can't quite tell where it is. But I'll go ahead and mark on them anyway.

CAPCOM Roger.

SC At the time, I can't find anymore room.

SC That's about the toughest star I've had to do so far?

CAPCOM Say again, Dick.

SC I said that's about the toughest one I've had.

CAPCOM We're giving you your max test since this is your last chance.

SC Well, if they get any dimmer than that I'm not going to be able to see them.

CAPCOM Roger.

SC Houston, on this particular star here is a big round, very dim - very dim orange ball that covers about two quarters of the sextant, but I can see the star through it, and even though it didn't appear orange itself.

CAPCOM Is that a sun reflection or what's causing the orange ball? Do you know?

SC I don't know. I would suspect it might be part familiar with the sun, but I'm really not sure, Ed.

CAPCOM Roger.

SC I don't have a complete orange ball in the sextant but I got the better half of it.

CAPCOM Roger. Copy.

SC We're going to patch and you can see how much of the moon is in that patch and that's a little bit more than that in here in the sun.

CAPCOM Roger, Dick. We suspect that's scattered light, Dick.

SC I'm sure it is.

END OF TAPE

SC Houston, 12.
CAPCOM Go ahead.
SC Don, I can't use this star either.
Once I start moving it there is so much darn light I move
the star completely and I can't keep track of it.
CAPCOM Roger. That's what the test is to show.
Thank you.
SC Okay. I'll press on the next one.
CAPCOM Roger.
SC As the famous astronaut once said,
Press.
SC Well, I guess that's a good one to
end on.
SC Looked good.
SC I'll give you an optics count again.
CAPCOM Okay.
CAPCOM Dick, Houston. Can you tell us how
the horizon compares now with the second batch of transcenter
that you did when you had a good clear horizon?
SC The second batch - with which second
batch are you referring to, on the way out or on the way in?
CAPCOM Transcenter on the way out.
SC Well, I think there's probably a little
learning process as to what is the horizon you have to be
using, I think far too much (garble) and you can almost see
what you think is the horizon and which also includes the
air glow layer and it's not that undefined. It fairly
definite, is very easy to use. I think the second set going
out is by far the better one and I've been using that particular
horizon for all of these on the way back in.
CAPCOM Roger. We copy. Thank you very much.
CAPCOM Apollo 12, Houston. If you're interested
we've got football scores, the morning headlines, and the
local weather for you, if you want to work that in among
your busy activities?
SC Don, go ahead. We'll listen right
now.
CAPCOM Roger. The scores from yesterday in
the NFL - Cleveland 28, New York 17; Detroit 16, Green Bay
10; Philadelphia 34, St. Louis 30; Washington 27 over Atlanta
20; Los Angeles 24 to Dallas 23; Baltimore over Chicago 24
to 21; Minnesota 52 over Pittsburgh 14; New Orleans 43 to
San Francisco 38. In the AFL - Oakland took Kansas City
27 to 24; Houston 32, Miami 7; New York 14, Cincinnati 7;
Boston 35, Buffalo - -

END OF TAPE

CAPCOM - 7. Boston 35, Buffalo 21 and San Deigo 45, Denver 24. In the news, splashdown stories in yesterdays news conference - you're getting good coverage. Pete's boys, Andy and Chris did a little soaring of their own yesterday. Scott Royce took the boys and Jane up for a ride yesterday. Andy said he'd rather be a soaring pilot than an astronaut. You can work that out with him later Pete. And Chris's reaction was "It feels good but I still like water skiing the best." There's a provocative headline "Boston hospital maternity wards are feeling the impact that 2 severe February snowstorms" and I'll let you imagine how the story runs. The Houston weather is pretty bad. It's overcast and drizzling, not really a day the Chamber of Commerce would be proud of, however, in the landing area we're reporting 1800 scattered and a high scatter, winds out of the East at 15 knots with 10 mile visability. The waves are 3 feet, you've got 5 foot swells and if you remembered to pack your lava-lava's it should be a lovely day in the South Pacific.

SC Thank you Don. It sounds real good and we'll be happy to see you there in land of lava-lava's.

CAPCOM Very good.

SC Houston, 12.

CAPCOM Go ahead.

SC Do you want us to disable for PTC C and D?

CAPCOM That's good. Yes.

SC Okay, fine. C and D are going off (garbled).

CAPCOM Apollo 12, if you will set IN on the high gain, pitch 40, yaw 270, we'll take over on the ground and switch your antennas for you.

SC Hello Houston, Apollo 12.

CAPCOM Go ahead.

SC Don, I guess we ought to start thinking about getting these state vectors up speed. Do I have the on board ones for the CSM and the ground CSM state vector in the LM slot? Do you want us to put the ground vector on both slots now?

CAPCOM Just a second, Dick, we're talking.

SC Okay.

CAPCOM Dick, Houston. The vectors that you've got in there now are quite satisfactory for the present but we're going to send you some much better ones in the flight plan so we'll - we don't think there is any need to play with it now and we'll send you up some better ones later.

SC Okay. I've got a 23930 for my (garbled) Okay.

CAPCOM Very good.

SC I didn't particularly appreciate your saying much better. You could have said a little better, couldn't you?

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 236:32 GET 654 698/2

CAPCOM Sorry about that; it's early in the morning down here.

END OF TAPE

APOLLO 12, MISSION COMMENTARY, 11/24/69, CST 07:04, GET 236:42 699/1

SC Hello Houston, 12. We are ready to start PTC whenever you give us the word.

CAPCOM Roger.

CAPCOM 12, give us a few more minutes, we will let the rate stamp out please.

END OF TAPE.

APOLLO 12 MISSION COMMENTARY, 11/24/69, 07:14 CST, 236:52:00 GET 700/1

CAPCOM Apollo 12, Houston. Let's go ahead and roll it on the PTC.

SC Roger. We'll start (garble)

CAPCOM Roger, and I'm about to turn you over to the tender care of Paul White so we'll see you when you get back to the LRL and have fun in the South Pacific.

SC Okay, Don, thank you much and thank you for all your help.

CAPCOM Very good, we'll see you later. Goodbye.

SC (MUSIC)

PAO This is Apollo Control at 236 hours 56 minutes. No one here in Mission Control is able, offhand, to identify that brief bit of music we got from the spacecraft. Apollo 12 now 49 635 nautical miles from the Earth and traveling at a speed of 8412 feet per second. In Mission Control at this time, we're completing a change in shift. Flight Director Pete Frank has taken over from Flight Director Glen Lunney. Our Capsule Communicator is astronaut Paul White.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 07:24CST GET237:02:00 701/1

SC Houston, Apollo 12.

CAPCOM Go 12.

SC Good morning, Paul is anybody down there thinking about getting this eclipse as far as we're concerned when the sun goes behind the Earth. We've got - what we've got is - we've got some 60 millimeter black and white and some 70 millimeter black and white.

CAPCOM Okay, we'll check on it. We're getting the times on that now. We'll pass those up to you and when we do we'll give you the dope on the - what they want to take them with.

SC 12, Roger.

CAPCOM 12, Houston. On the last LOS during your ROLL we did not acquire high gain and we expected to. Would you verify if your high gain angles are PITCH 40, YAW 270.

SC Okay, we have minus 40 - plus 40 PITCH.

CAPCOM That's correct it should be plus 40.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 7:34, GET 273:12:00 702/1

CAPCOM Apollo 12, Houston. I've got a couple of things for your operations checklist, page foxtrot 5-8.

SC Stand by.

SC Okay, say which page you got.

CAPCOM That's fox 5-8.

SC Oh, okay, 5-8.

CAPCOM Right.

SC Go ahead.

CAPCOM Okay, we pick up the checklist there with the EMS drift check and we would like to know the results of that on the ground when it's complete and now about the ninth line down where it calls out the set DELTA VC we'd like you to set the DELTA VC plus 100 feet a second if you would please.

SC Okay.

CAPCOM That's it then.

PAO This is Apollo Control, Houston at 237 hours, 18 minutes now into the flight. Apollo 12 is presently 47,865 nautical miles away from earth traveling at a speed now of 8587 feet per second. Our entry clock in Mission Control shows that we're 7 minutes, 4 - 7 hours, 3 minutes away from time of entry into the Earth's atmosphere. And in the Control Center Flight Director, Pete Frank, who will be on the console for reentry and recovery has gone around the room talking to all of the members of his flight control team as to status. Right now we're looking very good. Paul White is our new Capsule Communicator and has had some discussions with the crew since his arrival on the console. We're 237 hours, 19 minutes into the flight and this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 CST 0814 GET 237:52 703/1

PAO This is Apollo Control Houston at 238 hours
now into the flight of Apollo 12. We show Apollo 12 on its
continuing trip back to earth now traveling at a speed of
8956 feet per second and distance of 44 422 nautical miles
away from earth. We stand by and continue to monitor, and
this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 GET 2380200 CST 0824 704/1

SC Hello, Houston. Apollo 12.
CAPCOM 12, Houston. Go ahead.
SC Okay. Roger, Paul. This little EMS test,
the checklist for P41; I just ran it for 100 seconds. It's
100 feet per second. It ran for 100 seconds and now the EMS
reads 102.2. Over.

CAPCOM Alrighty. We'll message that and see what
it means down here, Dick, thank you.

SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 2381200 CST 834 705/1

CAPCOM Hello 12; Houston.

SC Go ahead.

CAPCOM Okay Dick; we're looking right now at a midcourse 7 of about 2 and a half feet per second; they want to get about another half hour of tracking after which they will work up your maneuver pad for you there.

SC Okay; we're not in any big rush except to get home, and we'll wait any time you need for that midcourse.

CAPCOM Okay.

PAO This is Apollo Control Houston at 238 hours, 15 minutes now into the flight of Apollo 12; you just heard Paul Weitz, our Capsule Communicator in Mission Control pass along an advisory with regard to MCC 7 to Dick Gordon in Apollo 12. Presently we are looking at a Delta V of some 2.5 feet per second with a burn duration of about 5 seconds. These numbers will be updated and we will perhaps delay the passing of the maneuver pad for Midcourse Correction 7 some 20 to 30 minutes to allow for additional processing of data on the part of our Flight Dynamics Officer and Retro Officers here in Mission Control. We presently show Apollo 12 at an altitude of 43 093 nautical miles above the earth, it's velocity continuing to accelerate upping its pace somewhat now at 9 113 feet per second. We are 6 hours, 6 minutes away from entry into the earth's atmosphere. This is Apollo Control Houston at 238 hours, 16 minutes now into the flight of Apollo 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 CST 0854 GET 238:32 706/1

PAO This is Apollo Control Houston at 238 hours 35 minutes now into the flight of Apollo 12. Our digital displays in Mission Control Center now show Apollo 12 41 356 nautical miles out from earth and traveling at a speed of 9320 feet per second. Meanwhile, our entry clock is up and our ignition clock for midcourse correction number 7, we show MCC 7 occurring 2 hours 45 minutes from this time and entry at 5 hours and 46 minutes from this time. We'll stand by and continue to monitor and this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston at 238 hours, 45 minutes now into the flight of Apollo 12. The Apollo 12 spacecraft presently 40,545 nautical miles now from Earth and traveling at a speed of 9424 feet per second. The Flight Dynamics Officer in Mission Control Center has just advised Flight Director, Pete Frank, that he has gathered data on the latest vector taken on Apollo 12, and we'll start computing the maneuver pad for MCC 7, midcourse correction 7 which will be passed to the crew. The present vector prior to MCC 7 shows (garbled) angle of minus 6.22 degrees. We're 2 hours and 35 minutes away from forecast time of ignition of midcourse correction number 7 and 5 hours, 37 minutes away from forecast time of entry into the Earth's atmosphere. This is Apollo Control, Houston.

CAPCOM Hello, Apollo 12, Houston. I have some information for you on the solar corona photo.

SC Stand by a second.

SC Go ahead, Paul.

CAPCOM Okay. They just want you to take photos coming out of the shadow, and they're requesting that you use the Hasselblad, because you indicated the black and white film. Use the 80 millimeter lens, an F stop of 2.8 focused at infinity. They want you to take as many photos as you can starting at a GET of 241:55:20. Now this is approximately 2 minutes before your sunrise. To start off with use a shutter speed of 1 second. As you come out of the shadow as soon as you can see a hairline sun, change your shutter speed to 1/25th, and stand by one. I'll have your final setting in just a minute.

CAPCOM Okay, 12. Then as I said as soon as you can see any sign of the sun at all switch your - change your shutter speed to one 1/25th. Take photos at that setting for 5 to 10 seconds after which as the sun comes up then change to F 16 at 1/500th of a second, and you can just take a bunch of photos of that, and for information the sunrise time is 241:57:18. Over.

SC Roger, understand. We'll start about GET 241:55:20 with black and white, 80 millimeter lens, and we'll try to set it at F 2.8 at infinity at 1 second, and the first time we see a sliver of sun we'll change it to 1/25th. We'll work on that for about 15 seconds and switch over to F 16 at 1/500th and take a few more.

CAPCOM Okay, Al. Change over after the sun - after you see the first sign of the sun go about 10 seconds instead of 15 and after the sun starts coming up your final F stop is 16 - that's F 16 at 1/500th.

SC Understand. F 16 and 10 seconds at the earlier setting of 2.8 at 1/25th.

CAPCOM That's affirmative, Al. Also in your

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 9:04 GET 238:42:00 707/2

CAPCOM flight plan we call for a COMM check at 239 hours. We're not going to run that COMM check. We would however, like you to go ahead and fire up your VHF and we'll hold off until we get indications of a good signal strength on the ground at which time we'll then run a VHF com check.

SC Sounds good. I just turned it on right now.

CAPCOM Okay, thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 09:15CST GET238:53:00 708/1

SC Also, Houston when you give us an attitude for this solar pictures how about giving it to us so it's good out window 5, that's our best window.

CAPCOM Roger, 12.

CAPCOM 12, Houston with your photography attitude.

SC Joe, go ahead.

CAPCOM Okay that's ROLL 300, PITCH 310, YAW 0 and that should give it to you out window 5.

SC ROLL Roll 300, PITCH 310, YAW 0, window 5.

CAPCOM Rog.

PAO This is Apollo Control, Houston at 238 hours 59 minutes now into the flight of Apollo 12. We presently show Apollo 12 at 39 258 nautical miles away from earth traveling at a velocity of 95 088 feet per second. Paul Weitz was passing along camera settings to Al Bean aboard Apollo 12 for the purpose of acquiring photography of the sun as it rises out above the earth. There will be a period in the flight plan leading up to that, where the Apollo 12 spacecraft will be passing through a period of total darkness. We're at 239 hours into the flight and continuing to monitor. This is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 GET 2390300 CST 0925 709/1

SC Houston, 12.
CAPCOM Go ahead 12.
SC Let me give you our final stowage configuration, we swapped back again. We've got everything the way we told you - Dick - We've got 1 suit under the left hand couch, and it has a helmet on and the other 2 helmets are on top of the Surveyor bag tied down right in front of A4 and A5.
SC Everything else is the way we gave it to you.
CAPCOM Okay. Thank you Pete.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 23913 CST 935 710/1

SC Houston; 12.
CAPCOM Go ahead 12.
SC Do you really want us to run this CMC self check?
CAPCOM Stand by.
CAPCOM Hello 12, Houston. We see no requirement for that self check.
SC Okay.
PAO This is Apollo Control Houston at 239 hours, 20 minutes now into the flight of Apollo 12. Apollo 12 present distance from the earth, 37316 nautical miles; its present velocity is 9851 feet per second. Continuing to monitor, this is Apollo Control Houston.
CAPCOM Apollo 12, Houston. We have some words on your P52.
SC Okay.
CAPCOM Okay, the attitude based on the PTC REFSMAT is ROLL 091.2; PITCH 161.7; YAW 021.6. The stars are 35, Rassel-hague, and Pete's old favorite, 37, Nunki. We haven't passed up a burn attitude yet but you - this will put you at the burn attitude except you'll be at 180 degrees out in ROLL.
SC Okay.
CAPCOM And your high gain angles are pitch minus 85, yaw 255.
SC Okay.
end of tape

APOLLO 12 MISSION COMMENTARY, 11/24/69 CST 0945 GET 239:26 711/1

CAPCOM Apollo 12, Houston. I have a midcourse pad for you when you're ready to copy.

SC Roger, go ahead.

CAPCOM Okay, this is midcourse 7: RCS G&N 24985 NA NA 241 215738 minus 00024 plus all zeros plus 00001 000 310 000 NA NA 00024 005 000 24. Your sextant star is 102417 395. There is no Apollo star available for a boresight check, your GDC stars are Sirius 15, Rigel 12. The angles 336 262 357. Four jet ullage, that's a 4 quad burn, and just some comments to pass up to you. They are not related to the burn. Since the burn is so short we will make no correction for your EMS drift. It looks right now like you have 64 hours of battery time on the water, and we're going around the room now to see whether or not to give you a GO for entry. Over.

SC Hey, you guys are all right. Stop the world, I want to get off.

PAO This is Apollo Control Houston at 239 hours 29 minutes now into the flight of Apollo 12. You just heard capsule communicator Paul Weitz -

SC When you are ready we will read back on that pad.

CAPCOM Okay, we're ready.

PAO Read the pad up. We are standing by now for readback.

SC Okay, we thought you were going to do something about that GO.

CAPCOM We are still massaging it. Go ahead.

SC Okay, 2495 NA NA 241215738 minus 000 24 plus all zips plus 00 001 000 310 000 NA NA 00024005 00024 102417 395 Sirius 15 Rigel 12, 336 262 357 and it's 4 jet burn.

CAPCOM That's affirmative, Al.

PAO This is Apollo Control Houston. That was Paul Weitz getting a readback from Al Bean aboard the Yankee Clipper and as you heard we are looking for a ground elapsed time of ignition for midcourse correction number 7 at 241 hours 21 minutes 57.38 seconds. The DELTA velocity for that burn 2.4 feet per second and it will be 5 seconds in duration. We're at 239 hours 31 minutes into the flight and this is Apollo Control Houston.

CAPCOM 12, Houston, we are going to let you come back, so I have an entry pad for you.

SC Okay, gosh you guys are okay today. We'll be ready to copy in just a second.

SC Go ahead.

CAPCOM Okay, entry to the MPL: 000 151 000 2440518 267 minus 1581 minus 16517 061 36116 649 11673 36198 2442218 0029. The next 4 blocks are all NA down to DO 400 0211 0019 0327 0804.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 9:55 GET 239:36:00 712/1

CAPCOM 0804, sextant star is 232947290, abort sight star is procion 016, OFF 146, left 10, lift vector up. Use EMS nonexit pattern, and some times for you here, GET of sunset, 240:32:07, sunrise 241:57:23. You'll cross the terminator at 244:14:04, and if you're interested moonset is at 244:20:05. Over.

SC Okay, 000151000, 2440518, 267 minus 1581 minus 16517, 06136116, 64911673, 36198, 2442218, 0029, 4000211, 0019, 0327, 0804232947, 290 procion 016, up 146, left 10, up ECMS nonexit pattern, sunset 240:32:07, sunrise 241:57:23, we'll cross the terminator at 244:14:04, moonset 244:20:05.

CAPCOM That's all Charlie, Al.

SC Roger.

PAO This is Apollo Control, Houston at 239 hours, 39 minutes now into the flight of Apollo 12. Our displays in Mission Control presently show Apollo 12 at 35,609 nautical miles away from earth and traveling at a speed of 10,106 feet per second. Paul Weitz passed along the entry pad to Al Bean in Apollo 12 and we will discern some of those numbers for you that were included in that pad based on a midcourse correction 7 burn. We show a time of entry into the Earth's atmosphere ground elapsed time of 244 hours, 22 minutes, 18 seconds, and from there reentry elapsed time to 05g of 29 seconds, a reentry elapsed time will begin a blackout of 19 seconds, a reentry elapsed time for in the blackout of 3 minutes 27 seconds, a reentry elapsed time drogue shoot deployment 8 minutes, 4 seconds. Apollo 12 should be at a velocity of 36,116 feet per second at the time it reaches 400,000 feet above the earth. We're 4 hours, 42 minutes away from time of entry, and this is Apollo Control, Houston.

CAPCOM Apollo 12, Houston. When you think those corona photos it probably wouldn't be a bad idea to turn the lights down in the cabin to try to minimize reflections off the window, Pete. Over.

SC Okay, we'll do that.

SC The computer's yours anytime you want it, Houston.

CAPCOM Okay, thank you.

END OF TAPE

APOLLO 12 MISSION CONTROL 11/24/69 10:05CST GET 239:43:00 713/1

CAPCOM Computer's yours, Dick.

SC Roger, thank you.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 GET 2395300 CST 1015 714/1

SC Houston, Apollo 12.
CAPCOM Go ahead, 12.
SC The CM RCS injector temperatures follows:
5 CHARLIE 4.3, 5 DELTA 4.4, 6 ALPHA 4.0, 6 BRAVO 4.5, 6 CHARLIE
4.3, 6 DELTA 4.8.
CAPCOM Roger. Copy, 12. Thank you.
CAPCOM Okay, 12. No preheat on the injectors.
SC Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 24003 CST 1025 715/1

SC Houston; 12, are you copying the DSKY?
CAPCOM Roger - we got em, 12.
SC Okay, we are going to pull it at this time.
CAPCOM Roger.
PAO This is Apollo Control Houston at 240 hours,
8 minutes into the flight. You heard the call from the Command
Module Pilot Dick Gordon asking the ground if they were watching
the display keyboard which was being watched here in Mission
Control. It reflected that Apollo 12 was undergoing an alignment
of its computer platform. This being done prior to the midcourse
correction 7 burn. We now show Apollo 12 at an altitude of
32696 nautical miles above earth, now traveling at a speed of
10566 feet per second. This is Apollo Control Houston.
SC Houston, this is 12.
CAPCOM Go ahead 12.
SC We're rolling left to the burn attitude;
are we gonna lose the high gain?
CAPCOM Stand by.
CAPCOM Affirmative 12; give us OMNI DELTA please.
SC Okay.

END OF TAPE

PAO This is Apollo Control Houston at
SC Apollo 12.
CAPCOM Go ahead, 12.
SC We're getting a spectacular view of
the eclipse. We're using the sun filters for the G&N optics
looking through and it's unbelievable.
CAPCOM Roger, understand, Dick.
SC The reason it looks so much different
is the rim of the earth is eclipsing it. It's not quite
a straight line, but it's certainly a large, large disc right now.
SC Quite a bit different than when we
see the moon eclipse the sun.
CAPCOM Good.
SC Anybody sitting down there know how I work -
to set this camera at to use the sun filter on it? Get
a couple of shots of this eclipse right through it?
CAPCOM Stand by and we'll check.
SC They'd better hustle.
CAPCOM Okay.
PAO We're at 240 hours 35 minutes as you
hear Dick Gordon -
SC You just cannot see the earth at all.
You just shield your hand from the sun and look out right
next to it where the earth should be. It's not there at all.
But if you stick your smoked glass up you can see where it's
cutting the sun. Otherwise it's completely invisible.
CAPCOM Roger, Al.
PAO You hear Dick Gordon and Al Bean describ-
ing the eclipse they are seeing. Very shortly they will start
their photography on this scene. We now show Apollo 12 at
an altitude of 30 044 nautical miles away from earth and
traveling at a velocity of 11 039 feet per second.

END OF TAPE

PAO Apollo Control, Houston at 240 hours, 37 minutes into the flight. We're 45 minutes now away from scheduled time of ignition for midcourse correction number 7. A small burn of 2.4 feet per second in DELTA-V. MCC7 will be retrograde implaned to steepen the entry angle somewhat. Preburn is showing an entry angle of minus 6.22 degrees. The Control Center would like to bring it up in the order of minus 6.5 degrees. Continuing to monitor at 240 hours, 38 minutes into the flight, this is Apollo Control, Houston.

SC Fantastic sight. What we see now is the sun is almost completely eclipsed now. What it's done is illuminated the entire atmosphere all the way around the Earth even when the sun is still on what looks like the western end of the moon - the earth to us.

CAPCOM Rog, understand, Al, and we're still working about getting a procedure for taking the photographs of it.

SC It's too light. We're using those for sunlight. I think they'll be exactly the same.

CAPCOM Okay.

SC But the diameter of the earth now in compare to the moon I'd say about 15 times the diameter at this point, but it's illuminating the whole atmosphere all the way around. It really looks pretty. You can't see the Earth. It's black just like the space.

CAPCOM Rog, understand. You cannot make out the earth at all.

SC No, you can't see any features on it. All you can see is a sort of purple blue or some shades of violet completely around the Earth. It's illuminated.

CAPCOM Roger.

PAO Apollo Control, Houston. Giving that vivid description was lunar module pilot, Al Bean, describing the illumination around the entire atmosphere of the Earth which at present is providing an eclipse over the sun. We're 240 hours, 44 minutes into the flight. We now show Apollo 12 29,137 nautical miles away from Earth and traveling at a speed of 11,213 feet per second.

SC In looking at the atmosphere it has blues and pinks, but instead of being banded, it's segmented which is very peculiar. I don't understand why. It may be the difference in being over the land masses and water or something.

CAPCOM Roger, Pete. Understand, is it kind of like you would see in the desert in the evening sometimes when you get that blue and pink streaking in the sky?

SC Yeah, except like I say it's segmented so that right from the sun around about a quarter of the Earth is pure blue, and then it becomes pink to about 20 degrees

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 10:57 GET 240:35:00 717/2

SC north, and then it turns back to blue again, and it's blue all the way around the bottom to where it turns pink again and then it turns blue again.

PAO That was - that was Pete Conrad adding his description of the view. We're at 240 hours, 45 minutes now into the flight of Apollo 12.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 24045 CST 1107 718/1

SC This is a heck of a time to be without any 70 millimeter color film I'll tell you. But I learned how to get it on a 16 millimeter camera.

CAPCOM Okay, Al; good show. We were just thinking the same thing.

SC Have you got any suggestion on the F stop for the 16 millimeter?

CAPCOM We're working on it.

SC It looks - it looks like this is going to have illuminated atmosphere, probably the whole time it's eclipsed. What it looks like now through the smoked glass is that the sun is completely set behind the Earth and you probably know better than I do from some - Roger we're using it at 1/60th at 1 frame a second and 1 - using 1.4 F stop and also at 2 - and 1.

SC What - what it looks like is the sun is set but it's so close to the limb of the moon on the backside there, that that bright light is being channeled through the atmosphere, and so if you look at it with a naked eye you can't tell the sun is set yet. Through the smoked glass you can see that it's no longer a disk there but you just see a bright white line the diameter of the sun.

CAPCOM Roger, Pete, understand. Al -

PAO This is Apollo Control, Houston, at 240 hours 54 minutes now into the flight of Apollo 12. We show - Houston, 12.

CAPCOM Go ahead 12.

SC We're sending these at 1/60th at 1.4 and that's where we're going to stay unless you come up with a better suggestion.

CAPCOM Rog, we got that, Dick, 1/60th 1.4 at 15 a second. They're working on it in the back room and actually according to our figures here you should still be seeing a little piece of the sun. You don't enter the full umbra until a little after 241 GET.

SC You are absolutely correct, we still have a little bit of sun through the horizon on the western limb.

CAPCOM Roger.

SC But right now the Earth is completely - the atmosphere of the Earth is completely illuminated all the way around, 360 and right in the center it's as black - it's as dark as the - as space behind it itself. This is really spectacular.

CAPCOM Roger.

SC Have you got any more adjectives for spectacular. I'd like to use some if you have.

CAPCOM No, we'll put somebody to work on that too.

APOLLO 12 MISSION COMMENTARY 11/24/69 11:07CST GET 240:45:00 718/2

PAO We presently show Apollo 12 at 27 975 nautical miles out from Earth, traveling at a speed of 11 445 feet per second. We're 26-1/2 minutes away from scheduled time of ignition of midcourse correction number 7 burn. This is a small burn, 2.4 feet per second in Delta V, done with the reaction control system. It's designed to steepen the entry angle.

CAPCOM These pictures through the optics, right?
SC Negative, Houston, through the hatch window.
CAPCOM Okay.
CAPCOM 12; Houston. Which lens do you have on the
DAC?
SC I have 18 millimeter.
CAPCOM Okay.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 11:17 GET 240:55:00 719/1

SC I'll repeat in one here.
CAPCOM Okay.
CAPCOM Okay, 12, Houston. We've got some words for you. Set aligns to F2, go to time on your mode select, and give us a 1 second exposure if you would. Hit the button that opens the shutter, hit the button again that closes it.

SC Understand, we'll work on it.
SC This is Apollo 12. One thing that puzzles us a little bit, perhaps Fido can answer it. It looks to us like the sun is being eclipsed by the Earth - the Earth's north pole or south pole. It's kind of hard to tell what - whether if it's its east or west rim. Have you got any additional dope there on that?

CAPCOM Okay, we'll find out and see which direction it's moving.

CAPCOM Hello, 12, Houston. For the mode select in time to function properly on the camera the shutter speeds has to be set to 1/60th even though that's not our actual shutter speed.

SC I'd say we've got it. Thank you though,
Houston.

CAPCOM Rog.

END OF TAPE

PAO This is Apollo Control, Houston at 241 hours, 10 minutes now into the flight of Apollo 12. We're presently 12 minutes away from ignition for midcourse correction number 7. That's a very small reaction control system burn 2.4 feet per second in delta velocity. We now show Apollo 12 at 26,345 nautical miles away from Earth and now traveling at a speed of 11,788 feet per second. Continuing to monitor this is Apollo Control, Houston.

SC This has got to be the most spectacular sight of the whole flight. We can see now that the sun's behind the Earth. We can see clouds sort of on the dark part of the earth and of course the Earth's still despiring by this thin narrow or thin blue and red segmented band. It's a little bit thicker over at the - now where the sun just set than it is at the other one, but it is really a fantastic sight. The clouds appear sort of pinkish gray and they're sort of scattered all the way around the Earth. It would be interesting to know exactly what part of the Earth we're looking at or what our nadir is now, because that part doesn't appear to have any clouds, and these others appear to be sort of revolving around it.

CAPCOM Roger, Al, understand that you can see clouds all the way around the Earth including the dark portion of it, and your nadir right now is just about the Indian Ocean.

SC Well, the whole - the whole Earth is dark to us. We looking at the night side, but we can see all the clouds. We haven't been able to distinguish land masses yet, but we might be able to in a minute when we get a little bit better adapted, and I think the airblow is eliminating the clouds down there.

CAPCOM Roger, Pete.

PAO Apollo Control, Houston. That was both Al Bean and Pete Conrad who reiterating the spectacular view.

CAPCOM I'll give you a time hack to ignition so you can check your GET. It'll be at 8 minutes which is about 40 seconds away.

SC What happened to your time hack?

CAPCOM Well, we're going to come up on 8 minutes, yeah, I blew it. I'll give you one at 7:30.

SC Okay, you had me worried for a minute.

CAPCOM Okay, we're discussing the important parts, such as which side of the world the sun's set on. 5, 4, 3, 2, 1, MARK. 7:30.

SC Okay, we're right with you.

SC Say, Houston. It's very interesting we can see lightning and the thunder storms down there on

SC the earth. I don't know how many miles
out we are, but all the cloud cover that has thunder storms
in it, we can see lightning - you can see it quite clearly,
flashing from where we are.

SC Yes, they look just like fireflies
down there blinking off and on.

CAPCOM Yes, you're about 25 750 out.

SC Yes, we're starting to look out for
these satellites now, we've been looking up ahead.

CAPCOM Okay.

SC Sure hate to run into one up here.

CAPCOM Yes, it could ruin your day.

END OF TAPE

PAO Apollo Control Houston. Synchronous satellites serve an altitude of approximately 22 000 nautical miles. We now show Apollo 12 at an altitude of 25 667 nautical miles from earth, traveling at a speed of 11 941 feet per second.

CAPCOM Apollo 12, Houston. If those lightning flashes are fairly frequent, we'd like to see if we can capture some of them on film, which would be the mode you are presently in with the speed set to 1/60th at F/2, remain in the time on the mode select and leave the shutter open for 1 to 2 minutes.

SC Oh yes, they're that frequent. There's 2 areas down there that are quite active right now.

SC Paul, have you got any idea of how to hold that camera still for 1 to 2 minutes?

CAPCOM No.

SC We'll give it a go after we get this burn off.

CAPCOM Okay.

PAO 3 minutes away now from our midcourse burn.

CAPCOM 12, Houston, on your question on where the sun went behind the earth. We've decided that it did go behind the western rim of the Earth in the northern hemisphere; it should reappear on the eastern rim still on the northern hemisphere.

SC Roger.

PAO 1 minute away now.

PAO 5 seconds away.

PAO Guidance and control confirms plus

SC Okay, plus 1/10, plus 1/10, minus

nothing. CAPCOM Roger, 12.

PAO That was Al Bean reporting the residuals on their midcourse correction 7 burn. It looks like a good burn, we will stand by for numbers. We are at 241 hours 23 minutes now into the flight of Apollo 12.

CAPCOM 12, Houston, what did your EMS read after that burn, please?

SC I hate to tell you, it's - I say it's 102.4, it's burn down to - at the end of the burn it was 101.4 and moving fast.

SC It was 102.7 at burntime after it had turned it on the normal switch at the proper 30 seconds before the burn.

CAPCOM Roger, understand.

PAO Apollo Control Houston at 241 hours and 25 minutes. Flight Dynamics confirms that our entry angle now reads minus 6.47 degrees based on the residuals

APOLLO 12 MISSION COMMENTARY, 11/24/69 CST 1137 GET 241:15 721/2

PAO that were read off from Apollo 12. We now show Apollo 12 at an altitude of 24 670 nautical miles from earth, presently traveling at a speed of 12 174 feet per second.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 GET 2412500 CST 1147 722/1

SC Houston, 12. We're better night adapted now, and by golly, we can see India, and we can see the Red Sea, and we can see the Indian Ocean quite clearly. It's amazing how well we can see, for that matter. We can see Burma and the clouds going around the coastline of Burma, and we can see Africa and the Gulf of Aqaba; it looks like the same photograph Dick and I took on 11.

CAPCOM Roger, Pete.

SC We can also distinguish the lights of large towns with our naked eye, just barely, and by using the monocular we can confirm that's what we're seeing.

CAPCOM Roger, 12. That's very interesting. You may now hold the class record for seeing lights.

PAO Apollo Control, Houston. We show Apollo 12 now 24 000 -

SC A couple of rip doozer thunder storms down there that are really letting to go.

CAPCOM What can you see of georgraphy there? Can you tell where the thunder storms are Pete?

SC Okay. I'll give you a fix on this one that is really bright.

PAO Apollo 12 now 24 200 nautical miles from earth. That's -

SC - Give you a fix and say that it's about 2 or 300 miles to the southwest of tip of India. There seems to be a weather system out there, and it's got thunderstorms all the way along it.

CAPCOM Roger, 12.

SC It's a - Venus is just below the earth. We can see Venus quite clearly, well, you can see all kinds of stars. Venus is just below the Earth. This is really a sight to behold, to see it at the nighttime like this.

CAPCOM Roger.

PAO That's Pete Conrad providing the running commentary from Apollo 12. We're now at 241 hours 31 minutes into the flight.

CAPCOM Hello, 12, Houston. For your information, weather does not have any surface reports from that region, but the sattelite picture does show quite extensive cloud cover to the area you're reporting the lightning.

SC Okay. I got a - unfortunately we got our earth maps stashed away. I wish I had them out. I'm not sure that I'm giving you the actual exact location. Everything, as it looks like, just north of India, and I'd say all up through China and Russia, if that's what we're looking at - the whole area in there looks like it is completely

SC covered with clouds.

CAPCOM Roger. Understand, Pete.

SC Also, right in the center of the Earth now, we have some real bright light shining, staying on that Dick is looking at with the binoculars. It's really bright.

CAPCOM Roger. Understand. Does it appear to be coming from your nadir point, which should be just off the eastern coast of India now?

SC Yes. Looks like it's coming just about out of the center of what we're looking at. I would say down from Burma and east of India.

CAPCOM Roger. That's just about your nadir.

SC I can't imagine what that is.

CAPCOM We can't either. We're checking for possibilities.

SC It's a steady light, and it appears in size, to be as big as any of the thunderstorms flashing.

SC It's as big as Venus at least.

CAPCOM Roger. Understand.

SC It's hard to tell if it is exactly in the center of the Earth or not, it's pretty close to being right in the center. Maybe just a little bit to our right, whatever that means. Just a little bit to the side that the Sun did not go behind the Earth on.

CAPCOM Roger. I think we understand that.

SC Looking at the air glow with the binocular is - boy there is another sight now, that is not like being in Earth orbit whatsoever. It's a bright red next to the Earth, and then it's got a green band in it, and then it's got a blue band.

CAPCOM Would you say these color bands encircle the Earth now, Pete?

SC Yes, but it's not the same all the way around. What I'm seeing is sunrise, really. The Sun is - it's about 40 degrees from the Sun and there's a red - bright red band, and then sort of a light green band that's very thin

END OF TAPE

SC And then a very light green band is very thin, and a blue one which must be all of the atmosphere.

CAPCOM Roger.

PAO Apollo Control Houston at 241 hours 37 minutes into the flight. Apollo 12 now at a distance of 23 358 nautical miles from earth. We're at 2 hours 45 minutes from time of entry into the earth's atmosphere. Apollo 12 now traveling at a speed of 12 507 feet per second. Standing by and continuing to monitor, this is Apollo Control Houston.

CAPCOM 12, Houston. Can you still see that bright light about in the center?

SC Al - we rolled so Al could take the sunrise pictures and the sun is pretty well wiped out that view we had. Now the sun's started up and the earth has turned black again.

CAPCOM Rog. Understand.

SC Houston -

SC Paul, does it look like we are going to have an update to our entry pad or not after that burn?

CAPCOM Stand by, I'll check on it, Dick.

CAPCOM 12, Houston, they want to get a little more tracking on you. It looks good. Some of the times may change a second or two. As soon as they get a good track we'll send it on up.

SC Okay, not pushing, just curious.

CAPCOM Roger.

PAO Apollo Control Houston. That was CAPCOM Paul Weitz advising Dick Gordon, command module pilot, that we want a little more tracking data before further refining the ground elapsed times numbers at entry. We're at 241 hours 45 minutes into the flight, we show Apollo 12 at 22 412 nautical miles in altitude and coming in now at a speed of 12 758 feet per second. This is Apollo Control Houston.

CAPCOM Hello 12, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 24145 CST 1207 724/1

CAPCOM Hello 12, Houston. If it's not already there, will you select the left VHF antenna please?

SC Roger - left VHF antenna.

CAPCOM Okay - and also; the ground readout of suit pressure dropped to zero a few minutes ago; will you give us your onboard readout?

SC Oh, it sure did. It reads zero also.

CAPCOM Okay, we just wanted to confirm it; thank you.

SC Houston, Apollo 12; I sorta think that time you gave me, to start shooting 2415520 is the time that the sun will be completely over the limb of the earth, and it would be too late then; I've been shooting per your instructions for the last 3 or 4 minutes; can you confirm that?

CAPCOM I'll check on it Al.

CAPCOM I understand Al - you can see the sun, now, is that right?

SC That's affirmative. I've been watching it for about the last 4 or 5 minutes; I didn't put a clock on it. I started that sequence you gave me when the sun started to peek around. I expect that the time I got that came out of the computer was the time when it's gonna be fully out.

CAPCOM Okay Al - good show.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 12:17CST GET 241:55:00 725/1

PAO This is Apollo Control, Houston at 242 hours 4 minutes now into the flight of Apollo 12. Apollo 12's distance from Earth presently 20 202 nautical miles, traveling now at a velocity of 13 400 feet per second. At entry we expect that velocity to reach 36 116 feet per second. In the Control Center we're presently counting down both being the Earth's atmosphere and landing. Time from entry presently reading 2 hours 17 minutes 40 seconds. From landing, 2 hours 31 minutes 46 seconds. Continuing to monitor this is Apollo Control, Houston.

END OF TAPE

CAPCOM Apollo 12, Houston. I have your landing area information if you're interested.

SC Go ahead.

CAPCOM Okay, the forecast hasn't changed since this morning, Pete, still calling for good weather. 1800 foot scattered variable broken, 10 miles, the winds in out of the east at 15, we've got 3 foot waves on top of 5 foot swells and they're running about 40 degrees apart. The altimeter is 2988, which gives a DELTA-H of plus 38 feet. Your landing time now looks like 2058 ZULU. Sunrise was at 1612, ZULU that is, and sunset will be at 0424. There are some widely scattered showers in the area less than 10 percent. On the recovery forces, the Hornet is on station. They will have 3 helos there - or 4 of them. Swim 1 and 2, with swimmers onboard, Recovery 1 for a swimmer and a medic, and Photo 1. We've also got 2 El's that will be airborne, that's Air Boss and Relay 1. We've got 2 C130's, it will be 40 minutes getting to onstation. They've got a para - rescue onboard. Their calls are Samoa Rescue 1 and 2. Over.

SC Houston, 12, we copied all that.

CAPCOM Roger.

PAO Apollo Control Houston. That was Capsule Communicator Paul Weitz giving Apollo 12 a status report on the primary landing area. We now show Apollo 12 continuing to excellerate in toward the earth traveling at a speed of 13 897 feet per second. Its present altitude above the earth 18 625 nautical miles. This is Apollo Control Houston.

END OF TPAE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 12:38 GET 242:23:00 727/1

CAPCOM Hello, 12, Houston. Give us omni alpha, please. 12, Houston. OMNI ALPHA, please.

CAPCOM Hello, Apollo 12, Houston. Requesting OMNI ALPHA.

PAO Apollo Control, Houston. We're 2 hours now away from time of entry into the Earth's atmosphere. Apollo 12 presently returning to Earth at a speed of 14,162 feet per second. Its altitude from Earth 17,867. nautical miles. We're at 242 hours and 23 minutes now into the flight of Apollo 12. This is Apollo Control, Houston.

SC Hello, Houston, Apollo 12.

CAPCOM Go ahead, 12.

SC Roger, we'd like to go through the logic sequence.

CAPCOM Stand by. Okay, 12. We were waiting for high bit rate. We have it now, so go ahead.

SC Okay. We'll give you a hollar as we get to them.

CAPCOM Rog.

SC Okay, we're down to ELS auto, Houston, and we're ready for the sequence logic 2 on UP. 61 logic, MARK, 62 logic, MARK.

CAPCOM 12, Houston. You're go for pyro arm.

SC Roger.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 12:48CST GET 242:26:00 728/1

CAPCOM Hello, Apollo 12, Houston. Over.

CAPCOM Apollo 12, Houston.

CAPCOM Apollo 12, Houston. Over.

CAPCOM Apollo 12, Houston.

PAO This is Apollo Control, Houston. 242 hours 42 minutes now into the flight of Apollo 12. Capsule Communicator, Paul Weitz, has placed several calls to Apollo 12. He plans to ask the crew to change antennas. We are receiving a low signal strength in the spacecrafts present attitude. We show a velocity at present of 15 195 feet per second, and Apollo 12 is now at a distance of - Apollo 12 presently at an altitude or distance above Earth of 15 224 nautical miles. Continuing to monitor this is Apollo Control, Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 GET 24242 CST 1304 729/1

CAPCOM Hello Apollo 12; Houston. Negative down link request you tune for max; over.

CAPCOM Hello Apollo 12 Houston; in the blind. Negative down link to try to raise us on any antenna you can, including VHF: over.

CAPCOM Hello Apollo 12, Houston; over.

PAO Apollo Control Houston; that's capsule communicator Paul Weitz continuing to call in the blind. We now show Apollo 12 at an altitude of 14546 nautical miles, away from earth, traveling at a speed now of 15536 feet per second. We'll continue to monitor and this is Apollo Control Houston.

CAPCOM Hello Apollo 12, Houston; over.

CAPCOM Hello Apollo 12, Houston; over.

SC Go ahead Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 GET 2425200 CST 1314 730/1

CAPCOM Hello 12, Houston. Over.

SC Go ahead Houston.

CAPCOM Okay. We haven't been able to get a hold of you guys for a little bit. Where you been?

SC Right here. Sitting on the checklist to OMNI CHARLIE like it said, which apparently wasn't the right one.

CAPCOM Yes, we tried to get an OMNI ALPHA call to you, but didn't get it in in time I guess.

SC Okay. What do you need?

SC Al, find out if they want anything different.

SC Okay.

CAPCOM 12, Houston. We lost everything, including down data, during that 10 or 15 minutes. Have you performed your sextant star check?

SC That's affirmative. We're just getting ready to align again, and we'll perform it right after we align.

CAPCOM Okay. Thank you.

SC (garble) checks out.

CAPCOM How about that?

PAO This is Apollo Control Houston at 242 hours 58 minutes now into the flight. That was Lunar Module Pilot Al Bean advising Paul White in Mission Control Center that they would very shortly be aligning their computer platform. We now show Apollo 12 at a distance of 13 117 nautical miles from Earth and its velocity increasing, now reading 16 238 feet per second. Continuing the monitor, this is Apollo Control Houston.

SC Houston, 12. You've got the torquing angles?

CAPCOM Roger. We've got them.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69 CST 1324 GET 243:02 731/1

SC Houston, we are activating the water boiler at this time.

CAPCOM Roger, 12.

PAO This is Apollo Control Houston at 243 hours 10 minutes now into the flight of Apollo 12. We show Apollo 12 at a distance of 11 323 nautical miles from earth.

SC That's okay.

CAPCOM Roger, Dick, that you.

SC And we're now in the checklist at the final stowage.

CAPCOM Roger.

CAPCOM 12, Houston, a reminder is that the camera settings for your fireball and chutes photos are not in the checklist. They only appear in the flight plan there.

SC Okay, thank you. We got them.

PAO 12's velocity now reading 17 294 feet per second. We've been advised by recovery that the Hornet's coordinate at the time of splash will be 15 degrees 44 minutes south, 165 degrees 8 minutes west, the target point for Apollo 12 reads 15 degrees 49 minutes south, 165 degrees 10 minutes west. The ship will be 5 nautical miles north and 2 nautical miles to the east of the target point, or 5.25 nautical miles straight line distance. We're now 1 hour 10 minutes 10 seconds away from the time of entry interface, and this is Apollo Control Houston.

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 13:34 GET 243:12:00 732/1

CAPCOM 12, Houston, we're ready with your state vector if you'll give us accept.

SC Okay, just a second. You've got it.

CAPCOM 12, Houston, the computer's yours.

SC Roger.

END OF TAPE

CAPCOM Apollo 12, Houston. The only change worth noting on your PAD is EMS range to GO.

SC Okay, what's that?

CAPCOM That is now 1166.3.

SC Roger. Copy 1166.3.

CAPCOM That's right.

PAO This is Apollo Control, Houston. You heard that callup from Capsule Communicator, Paul Weitz, advising Apollo 12 their entry PAD remains essentially the same as the one previously passed to them. Meanwhile, the Control Center reading of digital displays, we show ground elapsed time for entry in the Earth's atmosphere 244 hours 22 minutes 18 seconds. A ground elapsed time for begin blackout 244 hours 22 minutes 37 seconds. A ground elapsed time for 05G of 244 hours 22 minutes 47 seconds. A ground elapsed time for end of blackout 244 hours 25 minutes 46 seconds and for drogue deployment at some 23 000 feet in altitude of 244 hours 30 minutes 22 seconds. We're coming up now on 57 minutes from time of entry and this is Apollo Control, Houston.

CAPCOM Hello 12, Houston. Give us a right antenna on our VHF will you please.

SC Roger, right antenna VHF. Okay, Houston, are we go for pyro arm for Command Module RCS PREP?

CAPCOM Standby.

CAPCOM 12, Houston. You're go for logic one.

SC Logic 1, MARK. Logic 2, MARK.

CAPCOM 12, Houston. You're GO for pyro arm.

SC Roger, GO for pyro arm.

PAO This is Apollo Control, Houston at 243 hours and 28 minutes now into the flight. Apollo 12 continuing to progress down their checklist prior to entry in the Earth's atmosphere. You heard Command Module Pilot, Dick Gordon, talking with Capsule Communicator, Paul Weitz, for entry. Dick Gordon will be at the controls of Apollo 12 and in approximately entry interface minus 19 minutes Program 61, this is the entry preparation program is called and the spacecraft is pitched manually to obtain the horizon which is checked against a window marking of about some 31.7 degrees. At approximately entry interface minus 18 minutes, Program 62, the preentry Command Service Module separation program is called. At about minus 16 minutes for separation Yankee Clipper YAW is 45 degrees out of plane. A guillotine mechanism cuts the connecting wires and tubing between the Command and Service Modules and small charges set off by detonators sever the 3 tension ties. Separation should occur at approximately

PAO 15 minutes prior to entry in the Earths atmosphere. After separation the Command Module returns in plane. We'll stand by and continue to monitor. We now show our ground elapsed time at 243 hours 30 minutes into the flight. Velocity continuing to increase now. We read 19 351 feet per second. In less than an hour this velocity, however, will almost double. We show an altitude above Earth at this time of 83 072.8 nautical miles -

SC Coming up with the Command Module RCS check in just a minute.

CAPCOM Roger, 12. We're ready whenever you are.

SC Okay.

CAPCOM Apollo 12, Houston the check looked good here.

SC (Garble) I hear it looked good here.

PAO This is Apollo Control, Houston. What you heard there between Paul Weitz, and Apollo 12. Apollo 12 Command Module Pilot, Dick Gordon is presently going through an RCS check, reaction control system check, on the Command Module. We're at 243 hours 32 minutes into the flight less than 50 minutes now from time of entry into the Earths atmosphere. We now show a velocity of 19 748 feet per second, an altitude of 79 052 nautical miles. Standing by and continuing to monitor this is Apollo Control, Houston.

END OF TAPE

CAPCOM Hello 12; Houston. Give us OMNI CHARLIE please.
SC Going OMNI CHARLIE.

PAO This is Apollo Control, Houston; we are now at 243 hours, 40 minutes into the flight of Apollo 12. Apollo 12's some 42 and a half minutes away from time of entry into the earth's atmosphere. We presently show the Apollo 12 command and service module at a distance of 6703 nautical miles out from earth; velocity continuing to increase rapidly; now reading 21 013 feet per second. We reach entry interface at GET of 244 hours, 22 minutes, 18 seconds. We show the - in retro elapsed time, the first period of blackout beginning at 19 seconds from time of entry interface with the 12 spacecraft reaching 05 g at 29 seconds from time of entry interface. The period of blackout ending at 3 minutes 28 seconds from time of entry interface - the drogue deployment at 8 minutes, 4 seconds, plus time from entry interface, the deployment of the main parachutes system - the 3 parachutes - at 8 minutes, 52 seconds from time of entry interface, and time of splash 13 minutes, 49 seconds from the time we enter the earth's atmosphere. Continuing to monitor, this is Apollo Control Houston.

PAO This is Apollo Control Houston - at 243 hours, 42 minutes now into the flight. Recovery has just advised Flight Director Pete Frank that all Recovery Aircraft are on station and functioning. To quickly run down crew composition of these aircraft: AIRBOSS - this is an E1B tracer, the pilot is Commander Van E. Spradley, Co-Pilot is Lieutenant Al Pierce of Rochester, New York, Controller is Lieutenant Junior Grade Mike Meaney of Portland, Oregon and Technician, Aviation Electrician's Mate First Class Angus Davis of Weder, Utah. The Recovery number 1 Aircraft, this is the helicopter, SH3D sea king, which will carry the decontamination swimmer, will be piloted by Commander William Aut, age 36 of St. Louis Missouri, Co-Pilot Lieutenant Junior Grade Glenn Casey, age 27 -

END OF TAPE

PAO Co-Pilot: Lieutenant Junior Grade Glen Casey, age 27, Winston-Salem, North Carolina. The Decontamination Swimmer, Lieutenant Junior Grade Ernest Lee Jahncke, 26 years of age of Greenwich, Connecticut, the remaining 2 crewmen, the first crewman, Chief Aviation Antisubmarine Warfare Operator, Ken Cunningham, 27, Tiff City, Missouri, 2nd Crewmen, Aviation Antisubmarine Warfare Operator Second Class, Abram Dominguez, age 33, of Tombstone, Arizona. Swim 1, this is the Helicopter that is 10 nautical miles uprange from the carrier is piloted by Lieutenant Bill Sherrod, 28, Immokalle, Florida is his home, Co-Pilot: Lieutenant Junior Grade Larry Lybarger, age 27 of Anchorage, Alaska. The helicopter carries 3 swimmers who will deploy the sea anchor or potentially can deploy the sea anchor and flotation collar, and these include Lieutenant Junior Grade William C. Robertson, 27, Hampton, Virginia, Swimmer Sonar Technician First Class Arles L. Nash, age 29, Edinboro, Pennsylvania, and Photographers Mate Third Class William R. Pozzi, 22, Lynwood - yes - the Swim 2 Helicopter is positioned 15 nautical miles downrange, is piloted by Lieutenant Grey Linker, age 26, Moresville, North Carolina. The 3 swimmers aboard -

SC Go ahead, Houston.

CAPCOM Just a reminder, Pete, since your steam pressure readout on the secondary system has been erratic in the re-entry phase, just double check that you're on primary.

SC Roger. We're on primary.

PAO The 3 swimmers on Helicopter Swim 2 include Lieutenant Junior Grade John E. Wenger, age 27, Argyle, Wisconsin, Electricians Mate Second Class James D. Cousins, age 33, Toledo, Ohio, and Hospital Corpsman Second Class Dennis T. Ranalla, age 23, Calistoga, Florida. We'll stand by at this time and continue to monitor. We show now that we're -

CAPCOM 12, Houston. Give us VHF left, please.

SC Roger. VHF, left.

PAO Correction to that last hometown. That is Calistoga, California vice Florida. We show that we're 34-1/2 minutes away from time of entry into the Earth's atmosphere and this is Apollo Control Houston.

SC Okay, Houston (garble)

CAPCOM Roger, 12.

PAO Apollo Control Houston at 243 hours 52 minutes. That was a report from Apollo 12 indicating that the landing batteries have been turned on. We now show Apollo 12 at a distance of 4509 nautical miles from Earth and traveling at a velocity of 23 845 feet per second. We're 29 minutes from time of entry in the Earth's atmosphere and this is Apollo Control Houston.

END OF TAPE

CAPCOM Apollo 12, Houston. I'll give you a time hack at 25 minutes, which is about 50 seconds away, and if one of you wants to turn down your S-band volume, we'll get a VHF voice check.

SC Okay.

CAPCOM Hello Apollo 12, Houston. S-band VHF simul, how do you read?

CAPCOM Stand by for a mark at 25 minutes:
3, 2, 1, Mark.

PAO Less than 10 minutes away from time of separation of command and service modules.

CAPCOM Hello 12, Houston. Were you reading on VHF?

SC That's affirmative, Houston.

CAPCOM Roger.

CAPCOM 12, Houston. If you are talking VHF now you are very broken and garbled and we're not reading you yet.

SC Hello Houston, Apollo 12. How do you read?

CAPCOM Loud and clear, Dick.

SC Okay.

PAO Apollo Control Houston at 243 hours 59 minutes into the flight, Apollo 12 now at an altitude of 3688 nautical miles out from earth, velocity now reading 25 161.5 feet per second. This is Apollo Control Houston.

PAO Apollo Control Houston 244 hours into the flight now and looking at the display which shows the onboard computer, we see Apollo 12 in Program 61, which is the entry maneuver to command module/service module separation attitude. And Apollo 12 now 3688 nautical miles away from earth traveling at a speed of 25 161 feet per second.

PAO Apollo Control Houston, 244 hours 3 minutes

END OF TAPE

PAO Apollo Control, Houston at 244 hours, 3 minutes. The command and service module should be yawing very shortly to out of plane 45 degrees. We'll continue to monitor.

PAO Apollo Control, Houston. Now we show Apollo 12 with a velocity of about 25,161 feet per second. We're at 244 hours, 5 minutes into the flight. Present altitude 3688 nautical miles. Standing by, this is Apollo Control. The guidance and control officer confirms that 12 is moving to separation attitude at this time. We're at 244 hours, 6 minutes into the flight.

SC Okay, Houston. We're going to arm the pyros for SEP.

CAPCOM Roger, 12.

PAO We now read spacecraft weight of 24,978 pounds.

PAO This is Apollo Control standing by for separation less than a minute away now.

PAO Separation is confirmed by the guidance and control officer in Mission Control. We're at 244 hours -

CAPCOM Houston, we confirm separation.

PAO We're at 244 hours, 8 minutes now into the flight. Present altitude 3688 nautical miles.

END OF TAPE

PAO This is Apollo Control Houston. The Guidance and Control Officer confirms that Apollo 12 flying a ring A reaction control system entry. We are at 244 hours, 9 minutes into the flight. Apollo Control Houston monitoring the display showing the onboard computer. The onboard computer still in program 62, when program 63 comes up, on the computer, we will try to get an over the shoulder look at range to go to splash and velocity rates; we'll stand by and continue to monitor that display. We are now reading program 63, noun 64, we show a velocity -

CAPCOM I'll give you another hack on your DET at 10 minutes, which is about 1 minute from now.

SC Okay.

PAO We show a velocity reading of 31 037 feet per second, a range to go of 4305.2 nautical miles. Apollo Control Houston - Apollo 12 clipping along now - we show a velocity of about 31355 feet per second - range to go to splash 4229 nautical miles -

CAPCOM Mark - 3, 2, 1, mark - 10 minutes.

SC Roger - we're right with you.

PAO This is Apollo Control Houston - about 4 minutes before entry into the earth's atmosphere, we will lose data however we will retain communications with Apollo 12 through one of the ARIA aircraft - that would be at 5 minutes before entry interface. We now show a velocity of about 31945 feet per second, a range to go of 4014 nautical miles.

END OF TAPE

PAO The last tracking station in the Pacific to have data will be Guam. We're now at 244 hours 14 minutes into the flight of Apollo 12, continuing to speed in at a rapid clip, we now read 32 360 per second, range to go 3867 nautical miles.

PAO This is Apollo Control, Houston 244 hours 15 minutes now into the flight. Present velocity, 32 813 feet per second. Range to go 3641 nautical miles. Less than seven minutes now until time of entry in the Earth's atmosphere. We show a velocity of 33 190 feet per second, range to go of 3476 nautical miles. Guidance and Control reports 12 is looking very good, very small reaction control system usage at this time. We're at 244 hours 16 minutes now into the flight of Apollo 12. Less than 6 minutes to go til entry now. We show a velocity reading of 33 704 feet per second, range to go of 3223 nautical miles. Less than 5 minutes to go until entry. We show a velocity now of about 34 217 feet per second. Range to go to splash of 2934 nautical miles. We're at 244 hours 17 minutes now into the flight of Apollo 12. Retrofire officer confirms that we're looking good from his vantage point. We now show a velocity reading of 34 577 feet per second, range to go to splash of 2729 nautical miles.

END OF TAPE

PAO We've lost data with the Guam tracking station. We, however, will retain voice communications and capability through an ARIA aircraft. As we lost data, we read a velocity of 34,780 feet per second and a range to go of 2617 nautical miles.

CAPCOM Hello, Apollo 12, Houston through ARIA.

SC Loud and clear, Houston. (garbled) through ARIA Aircraft.

CAPCOM Roger, 12.

SC On my mark you'll have (garbled) SEP Houston. You can check your time, 3, 2, 1, MARK. (Garble) SEP.

PAO 2 minutes now from time of entry. Capsule Communicator, Paul Whites, has communicated through the ARIA Aircraft through our VHF. We're at 244 hours, 20 minutes now into the flight of Apollo 12. A minute and a half away now from time of entry into the Earth's atmosphere. Less than a minute away now from entry. The period of blackout should begin 19 seconds after we enter the Earth's atmosphere. We'll stand by and continue to monitor, and this is Apollo Control, Houston.

PAO Apollo 12 should be entering the Earth's atmosphere at this time at 400,000 feet.

CAPCOM Houston, coming up on blackout. We'll see you at 3:28.

PAO Apollo 12 should have begun its blackout some 7 seconds ago. We should be in blackout some 2 and 1/2 more minutes from this time. We now show a ground elapsed time of 244 hours, 23 minutes into the flight of Apollo 12.

END OF TAPE

PAO copy heading south 12 - we copied the Hornet is heading south 12 knots for its terminal position for splash, which would be 5.25 nautical miles north of our target point.

PAO Apollo Control Houston, Recovery reports the Hornet has radar contact from Apollo 12.

PAO We're less than 30 seconds away from the time when blackout period should be ended. Mission Control may try to get Yankee Clipper between the blackout and drogue deploy which occurs at some 23 000 feet to get some readings off the computer display keyboard, but its current plan is not to attempt to contact the Yankee Clipper after drogues have been deployed.

CAPCOM Apollo 12, Houston. Over.

CAPCOM Hello, Apollo 12, Houston. Over.

PAO Apollo Control Houston. Report from the Hornet indicates that that radar contact showed a range of 103 nautical miles and a bearing of 261 degrees.

CAPCOM 12, reading you loud and clear now.

SC Cash, right on the money.

CAPCOM Roger, we concur, Pete.

PAO Pete Conrad says right on the money.

SC A little over 3 g's and (garbled) mode.

SC That first time I got a shower at

6 g. I thought I had wiped all the water out of the tunnel.

CAPCOM Roger, 12.

PAO Very good voice reception through ARIA.

SC (Garble) miles to go and my (garble)

END OF TAPE

PAO Hornet advises radar contact now with a range of 69 nautical miles with an altitude of 12 000 feet. We're about a minute and a half away now from time of drogue deploy. This is Apollo Control Houston.

PAO Apollo Control Houston

CAPCOM Houston, we have radar and S-band contacts on you.

SC Roger.

PAO We should be getting that drogue chute deployment right now and we're standing by.

SC Got drogues, Houston.

PAO Al Bean reports deployment of the drogues.

PAO Less than 10 seconds away from main chute deployment.

SC (garble) standing by for mains.

SC I got the mains. They're not reefed - there they go, they're de-reefed.

PAO Al Bean reports that the 3 main chutes have deployed.

SC And we're at 8000 feet on our way down in great shape.

CAPCOM 12, Houston. Give us your land long, please.

SC (garble) We read you loud and clear, and we're okay.

CAPCOM Roger, Apollo 12, set your VOX (garble)

SC Say again. Over.

RECOVERY This is recovery. Talley ho, I have a visual. (garble)

RECOVERY This is Recovery. I am 3 miles north of the 300 radial. 3 miles - I have a visual. He is bearing 135 from me 6000. (Garble) looks good.

CAPCOM Roger. (Garble)

END OF TAPE

RECOVERY The command module is just above the
cover of the clouds - at 5500 feet.

PHOTO 1 Photo 1 has visual - 2 up zero, zero.

AIRBOSS Recovery, do you still have visual?

AIRBOSS Apollo 12 - Apollo 12 - this is AIRBOSS;
transmitting in the blind; your primary transmitter is inopera-
tive; inoperative. Switch to secondary. 259.7 and interio -
over. We have a visual on you; we have a visual on you.

RECOVERY This is Recovery - I have lost visual
contact - he hit the clouds (garble)

PAO What appeared to be smoke from the
spacecraft is the dumping of propellants.

RECOVERY This is Recovery - passing through 3500.
Read 4 miles on the command module. 3 chutes - looks good.
Going into another cloud.

AIRBOSS Apollo 12 - how do you read AIRBOSS?

SC Roger - read you loud. We're all
okay.

AIRBOSS Roger - understand. You look great.

RECOVERY This is Recovery - seem to be about
1500 feet above the water; 3 good chutes.

AIRBOSS Roger Recovery, roger.

RECOVERY This is Recovery - still contact.

RECOVERY Splashdown - splash. Mark, mark, mark.
3 chutes -

PAO We'll record splash at ground elapsed
time of 244 hours, 36 minutes, 24 seconds.

RECOVERY Photo, I don't see you - I've gone all
the way down.

PHOTO In behind you.

RECOVERY This is Recovery -

PAO Apollo 12 landed stable 2; the inflation
bags will upright them.

AIRBOSS Hornet, this Airboss; from the transmission,
I can read from Apollo 12 - -

PAO It takes about 6 or 8 minutes to upright
the command module from a stable 2 position with apex up.

RECOVERY This is Recovery - I see dye marker around
the command module at this time.

AIRBOSS Roger (garble)

RECOVERY (garble) smoke.

RECOVERY Looks like it's never used.

END OF TAPE

SWIM 1 (Garbled).
 RECOVERY This is recovery.
 SWIM 1 Say again.
 RECOVERY Hornet, this is recovery. I have a chute on the water of (garbled) and I'll probably just have to let the swimmers bring it in.
 HORNET Hornet, roger.
 PHOTO 1 This is Photo 1 stationed at 701, 50 at 2.5 miles. Coming up onto station 2 at this time at a 3, 2, (garbled). Closer to the water. Command module at the right.
 PAO A preliminary estimate from the Hornet places Apollo 12 some 2.5 nautical miles from the ship.
 PHOTO 1 Photo 1 confirms the floatation bags are seen.
 PAO And the command module is uprighting itself at this time.
 PHOTO 1 Floatation bags are being inflated right now theirselves. There's one floatation bag.
 HORNET Roger. Recover, Hornet. Understand you see a dye marker. Is that correct?
 RECOVERY That's affirmative. I have a dye marker in sight, it is presently about 1/2 the width of the command module.
 HORNET Roger.
 PHOTO 1 There's one floatation bag partially - correction - one inflation bag. Not uprighted - partially inflated. Houston, the command module is approximately in the direction of 290. Wind is from 120 at approximately 15 knots.
 RECOVERY 1 Recovery 1 to the Hornet.
 HORNET One's going to go at 2 miles.
 RECOVERY It goes stable 1.
 HORNET The command module is presently stable 1. I have three upright bags in sight. All inflated. One is slightly soft. Roger.
 PAO That report confirming stable 1 says the spacecraft is uprighted at this time.
 RECOVERY 1 Roger, we see swim 1 and recovery 1. Take your position as soon as I snag this chute, we'll go into the backup position.
 SC Recovery, Apollo 12. We read. Say how me.
 SC We're in (garble) shape, (garble) shape.
 PHOTO 1 This is Photo 1, the command module riding satisfactorily this time. We estimate 20 degrees pitch around the vertical axis. Three uprighting bags before we inflated.
 HORNET Air gang, Hornet. (garble) be advised Apollo 12 is on secondary out, secondary out.
 RECOVERY Swim 1, this is recovery. Tell me

APOLLO 12 MISSION COMMENTARY 11/24/69 14:59 CST GET 244:37:00 744/2

RECOVERY Swim one, this is Recovery, tell me when
you are in position.

SWIM 1 Roger. (Garbled)

RECOVERY I just want you to snag in the drogue at
this time, as soon as you get in position and I will go
over to back up.

SWIM 1 Roger. I am passing over (garbled)
at this time.

RECOVERY Okay. You swim to (garble)

SWIM 1 12, one. I saw some smoke on the DC.

SC Roger.

SWIM 1 Swim one is entering position to stop.

END OF TAPE

SWIM 1 Swim 1, Frank, (garbled).
SWIM 1 What's wrong, do you read me?
SWIM 1 (Garbled).
CAPCOM Apollo 12, Hornet Go ahead.
SC This is Apollo 12.
HORNET This is the Hornet com net, we answered you
Apollo 12, over.
SC Okay fine, do the swimmers have our radio ready
yet? I can hear them talking but (garbled).
HORNET That's affirmative they have been working on
the circuit. You're copying several of the helos, over.
SC All right, roger. We're copying everybody.
Apparently you are the only one copying us, we are all okay.
(Garbled) are still up there, we're in STABLE 1 waiting for
your guys to come along side.
RECOVERY Well, Houston, Recovery, swim one deploying
your first swimmer.
SC Swim 1, Roger.
RECOVERY Recovery, Hornet (garbled).
SPEAKER (Garbled).
AIRBOSS Apollo 12 on it, they're putting the 1st swim-
mer in the water now, over.
SWIM 1 (Garbled). - I'm going to require a little more
(garbled).
PAO The first swimmer deployed will attach a sea
anchor, an underwater parachute to stop the drift of the
command module.
SC Roger, we're copying you loud and clear, how
me?
CAPCOM Roger, if you read your relays for us and now
we're waiting for the first swimmer. Everybody's okay.
SC (Garbled).
PAO That is Dick Gordon talking from the Apollo 12
spacecraft.
SC How's that, over.
CAPCOM Standby (garbled) and all that.
SC Suggest you look for Apex cover, over.
SWIM 1 All right, roger, looking.
PAO The first swimmer into the water is Photographers
Mate Third Class William R. Pozzi, Pozzi spelled P-O-Z-Z-I,
age 22, Lynwood, California.
HORNET 12, this is Hornet. Are you up on the secondary,
is that correct? Over.
SC Sure is. We're up on both VHF right now.
HORNET Roger both. We're also relaying the circuit.
SC Okay, we're both VHF.
HORNET Roger.

PILOT Swim 1 going in (garbled)
RECOVERY Roger, Swim 1, this is Recovery. Cleared to commence your run to drop the flotation collar and two swimmers.

SWIM 1 Roger.

PHOTO 1 This is Photo 1. The sea anchor is attached. Number 1 swimmer is making his way upwind to deploy the sea anchor.

PHOTO 1 This is Photo 1. The sea anchor is deployed safely, holding satisfactorily. There is a positive thumbs up from the swimmer. Things are progressing normally. Swim 1 is commencing his run to deploy the flotation collar.

PAO Swim 1 will drop the flotation collar and two additional swimmers.

SWIM 1 Thumbs up from both swimmers. They're working the flotation collar toward the command module. Flotation collar is at the command module. There are three swimmers in attendance.

END OF TAPE

SWIM 1 Floration collar is at the command module with 3 swimmers in attendance.

PAO The remaining swimmers from Swim 1 -

SWIM 1 Being worked around the command module at this time.

PAO are Lt. (junior grad) William C. Robertson, 27, Hampton, Va. and Sonar Technician First Class Arles L. Nash, 29, Edinboro, Pa.

SWIM 1 And are attaching it to the CSM attachment ring.

CAPCOM Roger.

HORNET Okay, thank you.

SWIM 1 Cause - (garble) firmly attached. CS says holding firmly - inflation collar now being worked around the Command Module.

HORNET Okay, the collar is approximately two thirds around the Command Module. All operations progressing satisfactorily.

PAO The floatation collar is pulled out one side at a time and pulled around with bungy lines two air bottles will inflate.

SWIM 1 Three-quarters around the Command Module.

PHOTO 1 Photo 1 - swimmer appears to be experiencing no abnormal difficulties. Repeat no abnormal difficulties.

HORNET Roger. I got you. Roger.

PHOTO 1 Installation progressing normally.

CAPCOM Wonder if Apollo 12 is copying you, this circuits. Out.

PHOTO 1 The collar installation progressing normally. Collar is now all the way around the Command Module.

PHOTO 1 The swimmers are making their final checks on the collar installation prior to inflation. Photo 1 observes inflation commencing. Inflation in approximately 1 minute - -

CAPCOM Roger. You're clear.

PHOTO 1 (Garble) Floatation collar is complete.

HORNET Up there's the swimmer - There's the swimmer getting the BIGS out for the collar installation.

HORNET There's sort of a signal for the raft - two swimmers are working - -

END OF TAPE

AIRBOSS - downwind, the one swimmer is on the flotation collar, securing the strap at this time. Swim one hold for a moment. Swim 1, you are cleared to deploy one raft.

PHOTO 1 Observe both securing staps are now in place. The swimmer is making the final adjustments on these staps. Two swimmers are standing by approximately 30 feet downwind. Standing by to receive raft No. 1.

PAO The first of three rafts will be deployed very shortly.

PHOTO 1 To deploy Raft No. 1. The swimmers have the raft in hand at the command module. The command module is riding considerably more stable at this time with the installation of the flotation collar.

HORNET Photo, this is Hornet, I don't believe we copied the vertical axis stability.

PHOTO Roger. At this time vertical axis stability is approximately 15 degrees with the exception of the passage of the crest at which time it increases to about 25 degrees. The command module is riding in a very stable condition at this time. Presently Raft No. 1 is inflated and is being secured to the command module. I see two swimmers working their way upwind and I see the signal for the next raft is being made. Two swimmers are standing by upwind - (garble) it to the sea anchor for the command module. Swim 1 and Recovery you're clear to drop your second raft 70 feet upwind. Swim 1 is commencing his run to deploy Raft No. 2. Recovery is standing by in a backup position.

RECOVERY (garble) in a backup position.

PHOTO Roger. Departing north.

PHOTO Raft No. 2 is now being inflated, in place and it appears to be normal.

PAO Yankee Clipper for ten days a space worthy vessel now proving to be a sea worthy vessel. We're standing by.

PHOTO 1 I observed one of the swimmers at Raft No. 2. Deploying the sea anchor for that raft. The other swimmer has the tether line in hand and is swimming toward the command module. The swimmer from Raft No. 2 is halfway to the command module with the tether line at this time.

SWIM 1 (garble)

PHOTO 1 The swimmer is now at the command module with the tether line and is connecting it to the command module.

PAO The tether line will be hooked to the sea anchor ring.

PHOTO 1 Sea anchor is visible for Raft No. 2

END OF TAPE

HORNET Sea anchor is visible for raft number 2. Here's photo number 1. One swimmer is now making his way back to raft number 2. Presently have 1 swimmer, seated on the flotation collar. Number two swimmer is now at raft number 2. I've heard a thumbs up from raft number 2 swimmer.

RECOVERY #1 This is recovery 1 (garbled) about 10 seconds to run to drop decontamination swimmer.

HORNET R 1, understand.

RECOVERY #1 All right.

HORNET (garbled)

RECOVERY #1 That's affirmative.

HORNET Roger. Roger. Recovery is run.

RECOVERY #1 (garbled)

HORNET Photo 1, swimmer is away. Observe him in good condition in the water.

RECOVERY #2 Hornet. 1 to Hornet. Over.

RECOVERY #2 Hey Hornet, this is recovery -

HORNET Rogers 1, 2. Have 1 or more parachutes hooked. Over.

RECOVERY #1 This is recovery. One parachute hooked just to the left of the smoke light, sir. Just east of the smoke light in the water. Hooked in the drogue.

PHOTO #1 This is photo 1, the decon swimmer is now at raft number 2. We have 1 swimmer at the command module. Three swimmers at raft number 2 and observe the signal indicating that he is ready to receive decontamination equipment.

PAO The last swimmer in was the decontamination swimmer, Lt. (junior grade) Ernest Lee Jahncke. Lt. Jahnke is 26 years old from Greenwich, Connecticut.

HORNET Photo 1, the situation remains stable at this time. Three swimmers upwind. One swimmer at the command module.

RECOVERY #1 This is recovery. Swimmer (garbled) decontamination equipment at this time.

PHOTO 1 This is Photo 1. All operations are normal at this time. I see a swimmer seated in the raft. One in the water tending the raft sea anchor. One at the command module.

HORNET Photo 1, the command module is riding in a very stable condition. Approximately 15 degrees. About the vertical axis.

PAO At the given point, the Apollo 12 crew will open the hatch and receive flight coveralls and face masks from the decontamination swimmer who will be standing on the flotation collar. The decontamination swimmer again is Lt. Jahnke.

HORNET That was a metallic recovery.

END OF TAPE

SWIM 1 Apollo, Recovery. Turned away from the command module on the back side, the area around the hatch is still very good in color.

SWIM 2 Recovery 1 (garble) upright are still fully inflated.

SWIM 1 Plus 2, Recovery. Do you think your changes of further away please.

SWIM 1 Hard to receive. I broke down my transmitter.

RECOVERY 1 Apollo, 1. (Garbled) couldn't read the position.

HRONET Recovery, Hornet.

RECOVERY 1 Recovery 1 accepts that. (Garbled)

HORNET Roger. Request you keep the (garbled) smoke. Over.

RECOVERY 1 Do you want the sea anchor attached to (garble) with another (garble)

RECOVERY 1 Recovery 1 is in position. (garble) your nets is being lowered with the equipment aboard. (Garble) net is approximately two-thirds down. Recovery is maneuvering to place the rescue nets in the rafts.

Swim 1 (Garble)

RECOVERY 1 The swimmers have the rescue net in hand and is in raft number 2 at this time.

RECOVERY 1 There are the swimmers working removing the equipment from the rescue net. Operations normal at this time.

RECOVER 1 The rescue net is still in the raft. Now it seems that the signal has been given to retrieve the rescue net. The rescue net is on its way up.

RECOVERY 1 Recovery 1 appears all three (garble) (Garbled) (Garble)

RECOVERY 1 Recovery 1. All sea anchors are still holding firmly. Swimmer at the command module has reentered the water.

HORNET 12, Hornet. Come up (garble) over.

SC (Garbled)

RECOVERY 1 All operations progressing normally.

END OF TAPE

PHOTO 1 All operations progressing nominally.
PHOTO 1 Observe the swimmers in the raft putting
on their equipment.

PHOTO 1 Observe the swimmer at the Command
Module bringing the Raft No. 2 in towards the Command Module
working the tether line hand over hand. Swimmer No. 2
is approximately halfway in to the Command Module. One
swimmer has moved upwind to the No. 2 raft sea anchor ap-
parently to spill the sea anchor and facilitate moving Raft
No. 2 in. Approximately 10 feet to go. No. 2 raft is at
the Command Module. The swimmer is moving equipment from
Raft No. 2 to Raft No. 1 and has now moved over to Raft
No. 1.

PHOTO 1 All swimmers in good condition. All
are at the Command Module at this time, or either in the
vicinity.

PHOTO 1 One swimmer now has moved the decon-
tamine dispenser on to the flotation collar.

PHOTO 1 Now standing on the flotation collar.
In the vicinity of the crew access hatch.

(Garble) The swimmer is looking inside the
crew hatch. Everything appears to be satisfactory.

HORNET Two, Hornet. Over.

SWIM 2 Swimm 2, Hornet.

RECOVERY Hornet, this is recovery. Go ahead.

HORNET Roger. I'm trying to determine if-
there were 3 chutes sighted and if they are still in the
vicinity of the one that's hooked. Over.

RECOVERY We sighted two chutes. We snagged
a drogue on one of them. (Garble) one man raft with that
chute. (Garble) other two rafts (Garble). They were all in
the vicinity of the Command Module and the Command Module
right next to the water.

PHOTO This is Photo -

END OF TAPE

AIR BOSS went from the command module pump into the water.

PHOTO 1 This is Photo. The access, the crew hatch has been opened, the bags have been passed inside to the astronauts and the crew access hatch is closed once more.

CAPCOM We can hear you Apollo 12.

SC Apollo 12.

CAPCOM Roger. We're going off for radios now. Put on our gear.

PHOTO 1 Copy.

PHOTO This is Photo. At present, one of the swimmers is observing through the crew access hatch that everything appears to be going normally.

SWIM 2 Hornet, this is Swim 2, got them.

AIR BOSS Hornet, I think I have the information on the chutes conditions.

HORNET Roger.

PHOTO 1 Photo 1. The access hatch was opened that time was 36 and 5 seconds.

PHOTO 1 Photo 1. Operations progressing normally. Two swimmers standing off from Raft No. 1 - one swimmer at Raft No. 2 and one swimmer standing on the floatation collar.

PHOTO 1 This is Photo 1. The swimmer apparently had no difficulty. Repeat, no difficulty in opening the crew access hatch. Securing it once again. The swimmer on the floatation collar is observing the actions inside the Command Module through the crew access hatch window.

PAO The Hornet reports spacecraft now 900 yards upwind of spacecraft of the Hornet. The Hornet now 900 yards upwind of the Yankee Clipper.

AIR BOSS Photo 1.

PHOTO 1 Go.

AIR BOSS On the other one, up a little high.

PHOTO 1 Roger.

PHOTO 1 Photo 1. All operations normal.

PHOTO 1 This is Photo 1. The swimmer on the floatation collar is making frequent checks. Now the crew access hatch is opening and the first of the astronauts is coming - -

PAO The first astronaut coming out now of the Command Module.

PHOTO 1 The second astronaut is on his way out and in the raft. Clear. Safely in raft number 1.

PAO All three astronauts now in the raft.

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69, CST 3:39 PM, 752/1

HORNET All operations normal at this time.
RECOVERY #1 Astronauts peeking out from the command module, Conrad, Gordon, and Bean.
HORNET The crew access hatch is now closed (garbled) and is now being secured by the swimmer.
PAO Conrad, Gordon, and Bean was the exit order from the spacecraft.
HORNET The three astronauts and the swimmer are still checking the crew access hatch. There appears to be some difficulty in closing the hatch. They're working on it. Now, the second astronaut -
PHOTO 1 Photo 1.
HORNET Go ahead.
PHOTO 1 One astronaut and one swimmer. We see two astronauts at this time. Two astronauts (garbled). It seems the crew access hatch is now securely closed. There's a swimmer closing it with his tool. All three astronauts now in raft number 1.
PAO The hatch is secured, and all three astronauts are now in raft number 1. Recovery 1 helicopter will move in shortly.
HORNET Resting comfortably in raft number 1.
PHOTO 1 I observe the swimmer making the signal for the first pickup.
PAO The pickups will be made with the recovery net or so-called "Billy Que Net" which is in position.
PHOTO 1 This is photo 1 with a right drift a little bit. We cover the start of the (garbled) one.
PAO The "Billy Que Net" -
HORNET Everything is satisfactory at this time. Situation is normal. Recovery is commencing his run for his first pickup.
PAO The recovery net of "Billy QUE Net" looks much like a hanging chair. It's center of gravity is toward the back and has the effect that scooping up or -
RECOVERY 1 Rescue net is about 2/3 down.
HORNET Rescue net is 2/3 down. Recovery is maneuvering to put the rescue net in the raft. Rescue net is in the raft. Astronaut now is on his way up. Good vertical pickup. No oscillations. The first astronaut is half way up.

END OF TAPE

SWIM 1 (garbled) approximately three fourths up.
SWIM 1 The rescue net is at the cargo hatch. Astro-
naut is safely aboard.
PILOT They're still bringing the first astronaut
aboard, and it's Commander Gordon. Condition is good.
PAO We repeat that last report. The first astro-
naut aboard is Commander Gordon, condition good.
SWIM 1 Standby for pickup number two.
SWIM 1 Swimmer 1. The rescue net is half way down
the recovery is maneuvering for a second pickup. Safety
swimmers are still in the water. Operations normal.
SWIM 1 (garbled) is in the raft. (garbled) the second
astronaut is on his way up. Normal operations. Astronaut
is halfway up. The second astronaut is at the cargo hatch
(garbled).
RECOVERY This is Recovery. The second astronaut aboard
Commander Bean, condition good.
PAO We repeat that last report. The second astro-
naut aboard Commander Alan Bean.
SWIM 1 Preparation for the third pickup.
SWIM 1 Photo 1. (garbled)
SWIM 1 All operations normal.
SWIM 1 Photo 1 the rescue net is two thirds down.
Swimmer is maneuvering to place the net in the raft.

END OF TAPE

PHOTO 1 The rescue net is in hand and is being lowered into the raft. The third astronaut is on his way up. Third astronaut is halfway up. Astronaut is two thirds up. Third astronaut is at the cargo hatch being taken aboard the helicopter.

PAO The Apollo 12 crew is now aboard Rescue Helicopter 1.

(Garble) No. 5, take your pictures. Swim 2 going to recovery. (Garble)

HORNET Recovery, Hornet. Is the third astronaut in good condition? Over.

AIR BOSS Air Boss wants the condition of the third astronaut.

HORNET Come in, Recovery.

RECOVERY All three astronauts are aboard and condition is outstanding to above average.

HORNET Roger.

HORNET (Garble).

PHOTO 1 Hornet, Swim 1, does the bridge desire dye marker deployment?

HORNET Hornet, say again. Over.

PHOTO 1 Roger. Does the bridge desire dye marker deployment?

HORNET Hornet, wait up.

HORNET Photo 1, Hornet com net, over.

PHOTO 1 This is Photo 1. Go ahead.

HORNET Roger. Affirmative. We'd like dye marker deployment at the scene. Over.

PHOTO 1 Roger.

PHOTO 1 Photo 1, appears the astronauts are in good condition.

TOWER Recovery, this is Tower. Confirm that your main maneuver hatch is closed.

RECOVERY 1 Confirm, closed the hatch.

TOWER Roger. Have a CHARLIE in spot 5 and Photo, you have a CHARLIE on spot 9 for a relaunch.

PHOTO 1 Photo 1.

END OF TAPE

SWIM 1 The sea dye marker has been dumped. The swimmers are (garble)

HORNET Down on the bow at 13 knots.

SWIM 2 Hornet. Swim 2 (garble). Main chute in the small boat at this time.

HORNET Go ahead, swim 2.

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/24/69,CST 3:59 PM,756/1

ALL COMMERCIAL TV COMMENTARY

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 16:04 757/1

Commercial TV Commentary

PAO This is Mission Control in Houston, Texas -

Commercial TV Commentary

END OF TAPE

APOLLO 12 MISSION COMMENTARY 11/24/69 CST 1609PM 758/1

ALL COMMERCIAL TV COMMENTARY

END OF TAPE

APOLLO 12 MISSION COMMENTARY,11/24/69,CST 4:14 PM, 759/1

Commercial T.V. commentary

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69, 1619 CST, 760/1

All commercial TV commentary

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69, 1629 CST, 761/1

All commercial TV commentary.

END OF TAPE

ALL COMMERCIAL TV COMMENTARY

END OF TAPE

APOLLO 12 MISSION COMMENTARY, 11/24/69, CST 1640

762/2

SPEAKER Stand by.
NIXON Hello.
CREW Hello, Sir.
NIXON Commander, are you all three on.
CREW Yes, sir.
NIXON Well, I am just delighted to have this opportunity to welcome you back and I only wish that I could be out there for the splashdown. I can assure you that millions here in the United States and around the world were watching and I am just tremendously proud, personally and speaking also representing the American people of what you've done. As you know, before you took off, we talked on the phone that night and I invited you and your wives to come to the White House for dinner and I just want to be sure you can make that date?

CONRAD Yes, sir, we'll be there.
NIXON We'll expect to see you after you get out of quarantine. Now, there's one other thing I think I should tell you that I notice that you've been responsible for several firsts. You weren't the first on the moon, but you, I think, Commander Conrad, you were the first to sing from the moon. Right?

CONRAD I guess, so, Sir.
NIXON That's right and, also, we've had the first moonquake as a result of your flight and the first press conference from outer space. Now, after all of those firsts, I think that the nation wants some recognition and I've been trying to think of what would be the best way to recognize you. And over these past ten days, I noticed Walter Cronkite and the other commentators are always referring to you as Commander Conrad, Commander Gordon and Commander Bean and I, exercising my prerogative as Commander in Chief of the Armed Forces have decided that you should be promoted and that from this day forth, you shall be Captain Conrad and Captain Gordon and Captain Bean. Congratulations.

CONRAD Thank you, Mr. President. Thank you very much, Sir.

NIXON We look forward to seeing you.
CREW Yes, Sir, we look forward to being there. Thank you very much, Sir.

MQF Hello, Hornet, MQF.

HORNET Go ahead.

Roger, would you stand by for Dr. Paine please, who would like to speak with the astronauts.

HORNET Roger. This is Hornet MQF standing
by.
SPEAKER Roger. Putting him up now.
SPEAKER Hornet MQF, this is (garble) Dr. Paine
on. Give him a call, over.
HORNET Sir, Commander Conrad on, and Commander
Gordon.
PAINE Right. Pete.
CONRAD Yes sir.
PAINE How you doing?
CONRAD Just fine, sir.
PAINE Say you look real good.
CONRAD Yeah, everybody - everybody's in good
shape. Al got wacked with the camera when we hit down, other-
wise everybody is just fine.
GORDON Doctor, we're supposed to be in good
shape, we just came off a 10 day's vacation.
PAINE Now you know they got the new motto
now - Fly with NASA, we get you there and get you back on
time.
CONRAD That's correct. We go in any kind of
weather or anywhere.
PAINE Say, we're all real pleased about your
promotions. Congradulations.
CONRAD Thank you very much, sir.
PAINE That's a wonderful thing for a president
to do.
CONRAD Yes sir.
PAINE I won't hang on the line now because
I know you want to talk to your families, but I certainly
want to appreciate the - I want to send the appreciation of
all of us here at NASA for the tremendous job that you did
for all of us. And the scientists are extremely excited
about the results that are coming back, looking forward to
getting at that 90 pounds of samples you brought. And every-
one of us is just tickled to death with that magnificent job
you did. So thanks a lot fellows.
CONRAD Well, we enjoyed it sir. It was our
pleasure.
CONRAD Thank you, Dr. Paine.
GORDON We sure did. We were proud to repre-
sent the country and the moon, believe me.
PAINE Bye, we all look forward to seeing
you out in Houston in a few days. Have a good Thanksgiving.

END OF TAPE