CAPCOM -- so that we can change the variable parameter downlist so we can see the COAS CAL data and when you do the COAS CAL at your lower cabin press, we do not want you to update. We don't want to take those marks into the software. We just want to see the data so we can see if there's any change at 10.2 cabin. Also, the GN&C want you to know that your last COAS CAL, Vance, was one of the better ones they've seen down here.

SPACECRAFT Okay, real good. We'll go one update, then we'll just copy the numbers.

CAPCOM Also, have one note on your presleep activities for cabin repress when you're ready to copy.

SPACECRAFT Stand by one.

SPACECRAFT Okay, go ahead.

CAPCOM You've already gotten your supply water dump bravo to 20% but for your 10.2 cabin maintenance we would like you to delete the cabin repress. So no cabin repress is necessary. We'd also like you to reset a couple of the upper limits for PPO2 alpha and bravo and those are hardware changes. We will do the software limit changes for you. Channel 34, CPO2 alpha, high to 3.1 volts DC and Channel 44 PPO2 bravo, 3.0 volts DC higher limit, over.

SPACECRAFT Okay Mary, understand that in a couple of days or so we do not have to repress the cabin which is real good news. And PPO2 alpha and bravo you'll change the software but you want us to change the caution and warning hardware for 44 to 3.0/3.0 and say again 34.

CAPCOM Roger, Vance. Saying again 34. PPO2 alpha is 3.1 volts DC for your high caution and warning.

SPACECRAFT Houston, Challenger.

CAPCOM Channel, Challenger, Houston. We were having some comm problems on air-to-ground 1. Now how do you read?

SPACECRAFT Okay, read you fine. Understand you do not want to repress and was that, when was that repress to be. I'll have to check the CAP.

CAPCOM Roger, Vance. That's just the nominal cabin repress for presleep and it would be this evening only. During the presleep activities do not do your cabin repress.

SPACECRAFT Okay, got you and okay. On the PPO2 alpha and bravo, caution and warning 34 is I believe 5 1 or rather 3 1.
CAPCOM That's affirmative, 3.1. That's the high limit.

SPACECRAFT 14 to 3.1 and, I'm sorry. 44 is 3.0/3.0 and high limit on 34 is 3.1 and say the other limit again.

CAPCOM Roger. Channel 34 which is PPO2 alpha high hardware limit 3.1 volts DC and engineering units 3.1 psi.

SPACECRAFT Okay, copy.

CAPCOM Challenger, Houston. Also you should have teleprinter messages 27 and 28 onboard now.

SPACECRAFT Okay, we'll go look for them.

CAPCOM Challenger, Houston. Also requesting a time tag on your activation of the GAS group bravo.

SPACECRAFT I got to get that for you. Mary.

CAPCOM Okay, thanks, Ron.

CAPCOM And Challenger, Houston. Back on your aft panel, your encryption selection switch - you can go back to bypass at this time.

SPACECRAFT In bypass now. Houston, Challenger, GAS group bravo activated at 5 plus 56.

CAPCOM Roger, copy 5 plus 56 on GAS group bravo. Thanks.

END OF TAPE
Capcom: Roger, copy, 5+56, on GAS group Bravo, thanks.

Capcom: Challenger, Houston, with you through Santiago for 3 minutes.

Spacecraft: Hi, Mary, got you loud and clear.

Capcom: Got you loud and clear too. We'd sort of like to check and see whether you got teleprinter messages 27 and 28 okay.

Spacecraft: That's affirmative, Mary, we have them onboard, and looking at message 27 regarding the therapeutic aspirin, for decompression, be advised that EV 1 and 2 took two aspirin this morning about an hour prior to cabin depress at 10.2. And we're planning on taking 1 a day there after. Is that satisfactory, or do you want us to take another two tonight, and then one every morning, over.

Capcom: Roger, Bruce, that is satisfactory, and on that schedule we do not want you to take two more aspirin tonight, just carry on the way you were planning on originally.

Spacecraft: That's what I really what I thought the plan was, and we're sticking to it.

Capcom: Roger, Bruce, well I think they were just trying to remind you to take some aspirin in case you forgot. And Challenger, Houston, have a question from the cinema 360 folks. For Cecil B. McNeir, if he's available.

Spacecraft: Go ahead.

Capcom: Roger, the guys said that the set up looked real nice, and they'd appreciate a read down of the footage obtained on magazine 2, and other comments on the movie light and use of the slate and lightmeter would also be of interest. And this i of your 360 of the deploy.

Spacecraft: Okay, Mary. On the, setting the 360 up, I took at it, an incident lightmeter reading of about oh, 3 minutes before deploy, latest possible minute. And came up with a setting of slightly over F4, so I shut it between F4 and F5.6, over.

Capcom: Copy.

Spacecraft: Okay, Mary, and to continue that report, when we finished the Palapa deploy there was about 60, 60 feet of film remaining. Just as you called, I was just finishing off the final 60 feet on some footage of Bob taking some shots out of the overhead window on his back. And we've got Hoot floating in and
out of the flight deck, from the middeck, and (garble). That was shot at the same: between 4 and 5.6.

CAPCOM Roger, copy, we're going LOS at Ago, we'll pick you up at Botswana if not TDRS at 7:17.

SPACECRAFT Okay, (garble) cinema 360 meg for the RMS.

CAPCOM Roger copy, thanks, Ron.

CAPCOM Challenger, Houston, back with you through TDRS.

SPACECRAFT Hi, Mary, you're loud and clear through TDRS.

CAPCOM You're loud and clear too. Challenger, Houston, one more question from the 360 folks on the lighting used.

SPACECRAFT Go ahead, Mary.

CAPCOM Roger, they wanted to know whether the lighting was bounced or direct?

SPACECRAFT Lighting was bounced off the starboard wall, for both of the scenes I described, both the Palapa deploy and the footage of the photography. We used a window shade for the Palapa deploy and I used a wall for the photographic scenes, we had pretty high lighting in both cases, and it seemed that the wall was adequate in the case of, for the second case, So we used the window shade, right over Hoot's head, right behind his seat, over.

CAPCOM Roger, copy, thanks a lot, Ron, I appreciate all the information.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Mary, we are reinstalling the COAS, we decided to take it out for the deploy since we had so much gear up in the windows, so -

END OF TAPE
CAPCOM  Challenger, Houston.

SPACECRAFT  Mary, we are re-installing the COAS. We decided to take it out for the deploy since we had so much gear up in the windows. So that's just to let the GN&C people know that it was taken out and is being re-installed.

CAPCOM  Copy that, understand.

SPACECRAFT  Houston, Challenger.

CAPCOM  Challenger, Houston. Go ahead.

SPACECRAFT  Yes, Mary, you might mention to the cinema 360 folks I just loaded up the third magazine. Did so with some difficulty. It appears that the film was deformed, the part that had been, that is exposed outside the magazine and the camera's mechanisms were not engaging the perforations of the film evenly. The film was sort of wrinkled and wavy and it just did not go through smoothly. Played around with it and I worked it through slowly until I got the damaged part through into the magazine, closed it up, tested it so the magazine works well but I almost called you on it a while ago. So we have the third magazine loaded for the RMS tomorrow and we'll get any other interesting footage we can, over.

CAPCOM  Okay thanks, Ron. Copy and understand.

SPACECRAFT  Houston, Challenger.

CAPCOM  Challenger, Houston. Go ahead.

SPACECRAFT  Mary, we just completed an IMU align. Did you see it?

CAPCOM  Vance, this is Houston. We would like the angle error and time.

SPACECRAFT  Understand just the angle error.

CAPCOM  That's affirmative, angle error and time.

SPACECRAFT  Okay. Angle error was zero. Execution time was 3 days, 7 hours, 16 minutes, 30 seconds.

CAPCOM  Copy. That sounds good.

SPACECRAFT  Right.

CAPCOM  Challenger, Houston.
PAO This is Mission Control Houston at 3 days, 7 hours, 31 minutes mission elapsed time. We have loss of signal with the Challenger through the range of the tracking data relay satellite and we'll be out of communications for about 23 minutes until we pick up over Guam.

END OF TAPE
PAO  This is Mission Control Houston at 3 days 7 hours 31 minutes, mission elapsed time, we have loss of signal with the Challenger through the range of the tracking data relay satellite, and we'll be out of communications for about 23 minutes, before until we pick up over Guam. The crew is in the last hour and a half remaining in there day. They are already in their scheduled presleep period, and are due to turn in for the night in an hour and a half. Going through some of the final end of the day clean up items. Changing out lithium hydroxide canisters, as they usually do at the end of the day. And getting a few things squared away in preparation for tomorrow's EVA activities. Both of the EMU's have been checked out and recharged, and the crew will be getting started early in the morning with their final preparations for the first spacewalk of this flight, which will feature the checkout of the manuvering units. So we will be out of contact for about the next 22 minutes, at 3 days, 7 hours, 33 minutes, this is Mission Control Houston.

CAPCOM  Challenger, Houston, with you through Guam for 2 minutes.

SPACECRAFT  Roger, Mary.

SPACECRAFT  And Mary, we took some COAS marks, I can read off the biases if you'd like.

CAPCOM  We're standing by to copy those, or we can take them in Hawaii when we have more time, this is a two minute pass.

SPACECRAFT  Have you got anything else to tell us?

CAPCOM  Yeah, we'd like to request that you disable FDA on decomm 4, and --

SPACECRAFT  Okay.

CAPCOM  Also, like to request the GN&C, IO reset that, reinitialize the radar data channels, we lost them when the Ku-band was powered off.

SPACECRAFT  I'll reset on GN&C.

CAPCOM  Copy, and that's it for us, we'll give you the rest over Hawaii.

SPACECRAFT  Mary, we're looking at a PPO2, right now at 2.68 which is below the 2.75, is that included in the do not repress that you gave us earlier, or do you want us to pump up the O2.

CAPCOM  Check on that for you, Hoot.
CAPCOM Challenger Houston, we're about 20 seconds LOS, and for Hoot that is not required but it, you may go ahead and do that if you'd like to and we'll talk to you again through Hawaii at 8 + 04.

SPACECRAFT Okay, we'll see you then.

PAO This is Mission Control Houston, at 3 days, 7 hours, 58 minutes, mission elapsed time. We'll be coming up over the Hawaii station in about 6 minutes. Flight Controller's here in Mission Control, are making their final checks of Orbiter systems, before the crew goes to bed tonight. And preparing any last minute configuration changes, or messages to the crew.

CAPCOM Challenger, Houston, with you over Hawaii for 5 minutes.

SPACECRAFT Hi, Mary, loud and clear through Hawaii.

CAPCOM Got you loud and clear too.

SPACECRAFT Roger, Mary. Mary, this is Bruce, I got some numbers from spec 77 for the MMU people, if you are ready to copy.

CAPCOM Ready to copy.

SPACECRAFT Okay, at 3 days, 08 hours, 0000 minutes, MET. I will read the port and then the starboard numbers first, FSS toggle valve left +85, +117, right +99, +121. MMU toggle valve left, +50, +52, right, +47, +5-

END OF TAPE
SPACECRAFT    -- plus 99 plus 121. MMU toggle valve: left plus 50 plus 52; right plus 47 plus 53. GN2 tank: left plus 42 plus 43; right plus 38 plus 41. CEA plus 59 plus 65, over.
CAPCOM        Copy.
SPACECRAFT    And you may be interested to know we powered up the (garble) or EMU TV system and it checks out end to end, over.
CAPCOM        Thanks. That's good news. And Challenger, Houston. We'd like you to verify your startrackers are in track. We don't have that data available to us now.
SPACECRAFT    That's affirmative, Mary, items 3 and 4.
CAPCOM        Okay we copy that thanks and we have sent you over Hawaii message 29 which is your EVA information for tomorrow if you'd like to check it.
SPACECRAFT    Yes, we'll get to it in just a minute. We're reconfiguring the middeck here.
CAPCOM        Okay, that's fine.
CAPCOM        Challenger, Houston.
SPACECRAFT    Go ahead, Mary.
CAPCOM        Roger. Because you did the little repress, we'd like you to go back to that hardware caution and warning now and make 2 adjustments to channel 34 and 44 again when you're ready to copy.
SPACECRAFT    Okay. Ready to copy.
CAPCOM        Roger. We'd like channel 34 PPO2 alpha, the high caution and warning, now set at 3.2 volts DC and on channel 44, which is PPO2 bravo, we'd like the high limit set at 3.1 volts DC, over.
SPACECRAFT    Okay Mary, will do. We'll make 34 3.2, 44 3.1.
CAPCOM        Okay thanks. Sounds good and we're 30 seconds LOS Hawaii. We're going to lose you for 5 and we'll pick you up through TDRS.
SPACECRAFT    Okay. Good deal.
PAO           Mission Control Houston. We've had loss of signal through Hawaii and we'll pick up again in about 3 minutes through the tracking data relay satellite.
CAPCOM    Challenger, Houston with you through TDHS.

SPACECRAFT    Roger, Mary, loud and clear. We're looking over the teleprinter message.

CAPCOM    Roger. We've got a copy down here and we're standing by to answer any questions if you have any. Also, we're standing by for a speaker check if you want to run one.

SPACECRAFT    Houston, Challenger, with a flight deck speaker check. How do you read?

CAPCOM    Got you loud with background static.

SPACECRAFT    Okay, we've got you loud and clear on the speaker.

CAPCOM    Yes, you're readable, Hoot.

CAPCOM    And Challenger, Houston. We just sent you a state vector, it is good, through rev 60 which is your next PLS KSC.

SPACECRAFT    Okay, thank you.

CAPCOM    And Challenger, Houston, for Vance. We're ready to copy when you're ready to read us your COAS CAL info.

SPACECRAFT    Okay, I'll give them to you.

CAPCOM    Standing by.

SPACECRAFT    Okay, Mary, Ready to copy numbers?

CAPCOM    Roger, we're ready to copy.

SPACECRAFT    Okay, the bias I started out with was .09. Then after marking I came up with the following successive marks. Of course, none were incorporated. .74 .57 .58 .56 .54 .50 .49 .60 .65

CAPCOM    Roger, we copy that, Vance. Thanks.

SPACECRAFT    Okay.

END OF TAPE
STS-41-B AIR/GROUND TRANSCRIPT  t174j  037:21:29  2/6/84  PAGE 1

SPACECRAFT  -- .49 .60 .65.

CAPCOM  Roger, we copy that Vance. Thanks.

SPACECRAFT  Okay.

PAO  Mission Control Houston. 3 days, 8 hours, 29 minutes. Final messages being prepared for the crew before they're put to bed for the night. About 30 minutes remaining before their scheduled sleep period. Flight Controllers here reviewing those remaining items that they have to get all the systems squared away to allow the crew to get a full night's rest before the EVA activities in the morning. We have a statement here regarding the Palapa satellite. Hughes tracking personnel have confirmed that the Palapa satellite cannot be found in its expected orbit. Repeating that statement about the Palapa satellite, Hughes tracking personnel have confirmed that the Palapa satellite cannot be found in its expected orbit. We have about 37 minutes remaining in this TDRS pass although the final verbal contacts with the crew are expected only shortly and they will be put to bed for the night. Challenger on orbit number 54 approaching the western coast of South America. We're 3 days, 8 hours' and 31 minutes into this flight. This is Mission Control Houston.

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead.

CAPCOM  Roger, Vance. We are just going to sign off for now with a reminder that the only outstanding thing we have is a LiOH changeout and we hope you have a good night's rest. We're looking forward to seeing the show tomorrow.

SPACECRAFT  Okay, real good and we probably need a little time to digest that message and talk about it in the morning.

CAPCOM  Roger, Vance, and John and Jerry are standing by here and they'll be glad, the EVA folks, and they'll be glad to talk to you about it tonight if you want to talk to them.

SPACECRAFT  Mary we're still, we're trying to get a little bit ahead of the game on equipment prep right now so we'll take a look at it later and -- about it in the morning.

CAPCOM  Okay. They'll be around in the morning to discuss it, thanks.

PAO  This is Mission Control Houston. 3 days, 8 hours, 50 minutes mission elapsed time. Final preparations for the crew to be put to oed for the night are being made. Just about 9 minutes left in their wake cycle for the day. Some people
receiving the NASA Select line via the satellite recently, in the last several minutes or so, saw what was a circuit test of some of the equipment and most of those now are back on the regular NASA Select line. The local immediate JSC area continued to receive the normal NASA Select feed.

END OF TAPE
Mission Control Houston, Orbiter Challenger now on orbit 55, passing across the Saudia Arabian peninsula. Here in the Mission Control Center the planning team is taking over and is putting together a schedule for tomorrow's activities. They're looking at nominal EVA with three small additions, should they be possible. The first is a plan to bring in camera D, the alien camera out in the payload bay and change that out with one of the cabin cameras. The second contingency addition is to fix the thermal blanket on the Cimena 360 GAS canister. And the third is to repair a microswitch on the SPAS payload. The mass spectrometer has a small problem which is thought to be a microswitch and they're going to try to change that out. But those EVA tasks have been sent up to the crew with the caveat that they're not to impact planned tasks or timelines of the nominal EVA. And the planning team will be putting together an idea of how that can be done. Orbiter Challenger currently in a 157 by 150 nautical mile orbit and FIDO reports that weather is good at all continental United States landing sites for Tuesday should an early landing be necessary. We're still expecting again, our change-of-shift briefing at approximately 4:30 p.m. building 2, room 135. At Mission Elapsed Time, 3 days 9 hours 8 minutes this is Mission Control Houston.

Mission Control Houston. We expect that the change of shift press conference originally scheduled for 4:30 p.m. will be delayed until approximately 5:00 p.m. this afternoon and that will still take place in building 2, room 135. Mission Elapsed Time, 3 days 9 hours, 24 minutes, this is Mission Control.

Mission Control Houston. The originally scheduled 4:30 p.m. change-of-shift press conference has been delayed until approximately 5:00 p.m. and that will take place in building 2, room 135. Mission Control Houston, at 3 days 9 hours 25 minutes.

Mission Control Houston. Our 5:00 change of shift press briefing will have as participants Glynn Lunney, Program Manager for the National Space Transportation System, Mr. Richard Brandes from Hughes Aircraft, Mr. Charles Ordahl from MacDonnell Douglas, and Harold Draughon off-going Flight Director. That briefing begins at approximately 5:00 p.m. Central Atandard Time, building 2, room 135. At 3 days 9 hours 52 minutes, this is Mission Control Houston.

END OF TAPE
Mission Control, Houston. That view you see on NASA Select is a shot of some of our flight controllers taking a look at a mockup of camera D, an engineering mockup of the camera that we're going to attempt to change out tomorrow during the EVA, searching for a firsthand understanding of the pan and tilt mechanism on that camera. At Mission Elapsed Time, 3 days, 11 hr, 3 min, this is Mission Control, Houston.

Mission Control, Houston. The Orbiter, Challenger, now over the heart of South America on orbit 57. In the Mission Control Center, the planning team is looking at some of the finer points of who does what when during the EVA tomorrow. Attempting to slip in the added three tasks that we're going to try to accomplish during that EVA, the camera changeout, camera D changeout; repair the thermal blanket on the Cinema 360 GAS canister; and repair of a microswitch on the SPAS Mass Spectrometer Experiment. At Mission Elapsed Time, 3 days, 11 hr, 50 min, this is Mission Control, Houston.

Mission Control, Houston. Processing low bit TDRS data as Orbiter, Challenger, passes across the southern Pacific Ocean on orbit 57. Cabin pressure now at 10.07 psi, a prebreathe maneuver of sorts for tomorrow's extravehicular activity. Cabin temperature at about 75 deg, and the crew is in the midst of their sleep shift with about 3 hr, 51 --

END OF TAPE
STS-41-B  AIR/GROUND TRANSCRIPT  t177j  038:02:08  2/6/84  PAGE 1

PAO  ...cabin pressure now at 10.07 psi, prebreathe maneuver of sorts for tomorrow's extra vehicular activity. Cabin temperature at about 75 degrees and the crew is in the midst of their sleep shift with about 3 hours 51 minutes left. At Mission Elapsed Time, 3 days 13 hours 8 minutes, Mission Control, Houston.

PAO  Mission Control, Houston. Orbiter Challenger now over North Africa passing through the ranges of the Dakar tracking station on the beginning leg of orbit 58. At the last equator crossing, we traveled 1,288,954.4 nautical miles into the mission. Orbiter Challenger now traveling 17,310 miles per hour at an altitude of 157 nautical miles, period of the orbit is 1 hour 30 minutes 22 seconds. Here in Mission Control, the planning team is putting together the CAP update, the flight execute package for tomorrow. Tomorrow's activities include, of course, the first tryout of the manned maneuvering unit and those activities begin at approximately 6:30 a.m. central time with the egress from the airlock by Mission Specialists McCandless and Stewart. At Mission Elapsed Time, 3 days 13 hours 41 minutes, this is Mission Control Houston.

END OF TAPE
PAO  Mission Control, Houston. We've gone AOS TDRS, and
processing low bit rate data through the Tracking and Data Relay
Satellite as Orbiter Challenger moves up over the south Pacific
Ocean on orbit 59 toward South America. All quiet aboard and in
Mission Control with 2 hr and 15 min remaining in the crew's
sleep period. At Mission Elapsed Time, 3 days, 14 hr, 44 min,
this is Mission Control, Houston.

PAO  Mission Control, Houston. Orbiter Challenger now
passing over Indonesia on rev 59. All quiet here in the Mission
Control Center. About an hour and 12 min left in the crew's
sleep period, and the planning team has pretty well put together
the schedule for tomorrow's activities, all the updates and
changes that have to go in before the crew awakes. And that
teleprinter message is going to be sent up soon. We are
expecting television tomorrow during the extravehicular activity,
basically, through Hawaii, Goldstone, and MILA on our ground
tracking network on orbits 65, 66, and 67; possibly on orbit 68,
but that'll be a real-time call in the morning, and we're putting
the TV schedule out at this hour. At Mission Elapsed Time, 3
days, 15 hr, 48 min, this is Mission Control, Houston.

PAO  Mission Control, Houston. Orbiter Challenger now
over Australia on orbit 59, and we're wondering here at JSC
whether there's any need to have a press briefing, the regular
change-of-shift briefing at 12:30 a.m. this morning. We suspect
there is no need, and toward that end, we'd like to ask any news
media people, if they do have a desire to hold that briefing,
that they call the Kennedy Space Center newsroom, or the Johnson
Space Center newsroom, and they'll get the word to us. At
Mission Elapsed Time, 3 days, 15 hr, 56 min, this is Mission
Control, Houston.

PAO  Mission Control, Houston. We're about 4 min from
acquisition of signal through the Tracking and Data Relay
Satellite where we expect to dump some data from the OPS
recorders on the spacecraft. Again, we are planning to cancel
the 12:30 a.m. change-of-shift press conference. If you have any
desires to the contrary, I remind you once again to please call
the JSC newsroom, or the KSC newsroom. At Mission Elapsed Time,
3 days, 16 hr, 11 min, this is Mission Control, Houston.

END OF TAPE
PAO ...the KSC newsroom. At Mission Elapsed Time 3 days 16 hours 11 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. The Orbiter Challenger has now entered orbit 60 and here in the Mission Control Center, we have gone ahead and canceled the 12:30 a.m. change-of-shift press conference. Again that briefing is cancelled. At Mission Elapsed Time, 3 days 16 hours 31 minutes, this is Mission Control, Houston.

PAO This is Mission Control, Houston. The Challenger on its 60th orbit of the Earth at Mission Elapsed Time 3 days 17 hours 13 minutes. Data shows that two of the cathode ray tube displays in the flight deck have been activated, indicating that the crew is awake and active in the Orbiter. There has been no wake up call as yet but we expect that will occur when we reacquire signal through Yarragadee in about 9 minutes from now. This is Mission Control, Houston.

(wake-up music)

CAPCOM Good morning Challenger, Houston is with you.

SPACECRAFT Morning John. How do you hear?

CAPCOM Roger, you're loud and clear.

SPACECRAFT Okay, thank you for the music again, that's great. We, I just read the teleprinter, the news, and that blows our minds.

CAPCOM Roger, understand. Certainly as you know, Vance, everything that the spaceship did and all the procedures that you did were absolutely correct and they were done flawlessly and it blew our minds too. And we're having, as you can understand, a lot of ensuing assessments still going on.

SPACECRAFT Yes, we can understand.

CAPCOM And by the way, the wake-up music this morning was by the courtesy of the Air Force Academy Chorale.

END OF TAPE
CAPCOM ... as you can understand a lot of ensuing assessment is still going on.

SPACECRAFT Yes, we can understand.

CAPCOM And by the way, the wake up music this morning was by the courtesy of the Air Force Academy Chorale.

SPACECRAFT Very nice. Sounded great.

CAPCOM Roger and we're with you for another 2 and 1/2 minutes over Yarragadee.

PAO This is Mission Control, Houston. Wake up music was an armed forces medley which covered three of the services. The Marine Corp., of course is Vance Brand's alma mater. He's now a civilian but was originally trained as a Marine Corp pilot. The Navy hymn in honor of Mission Specialist, Bruce McCandliss and Challenger Pilot, Hoot Gibson, both Naval Officers. And the Army song honoring the nation's first United States Army Astronaut, Bob Stewart. And the music was performed by guess who, the U.S. Air Force Academy Chorale. And Vance Brand's ...

CAPCOM Challenger, Houston, we're going to leave you here for a couple of minutes. See you at Orroral.

SPACECRAFT Okay Houston, see you at Orroral.

PAO This is Mission Control, we have a brief keyhole that we'll pass through here before we pick up Orroral for another 4 minutes of air-to-ground. And Vance Brand, acknowledging the teleprinter message and reacting to the news, the first indication that the crew has gotten concerning the failure of the PALAPA satellite to achieve orbit. Mission elapsed time is 3 days, 17 hours, 29 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston's with you through Orroral for 4 minutes.

SPACECRAFT Roger, loud and clear.

CAPCOM Challenger, Houston, we're going LOS here in 30 seconds, we'll see you TDRS at 17 plus 51.

PAO This is Mission Control, we're processing TDRS data now at mission elapsed time, 3 days, 17 hours, 52 minutes.

CAPCOM Challenger, Houston's with you through TDRS.

SPACECRAFT Got you loud and clear through TDRS, John.
CAPCOM      Roger, you're loud and clear, too. Challenger, Houston, be advised in a couple of minutes, we're going to be running an encryption test of our launch config over MILA and Bermuda, so I'll be giving you a call to turn your encryption ON and then your encryption OFF. So if you have somebody back by ALL in about a minute, I'll give you a call and ask you to put the encryption to TR.

SPACECRAFT  Okay John, we'll stand by for that.

CAPCOM      Challenger, Houston calling. If you could take the encryption and go to TR now, please.

SPACECRAFT  Okay, encryption going TR.

CAPCOM      Thanks a lot, Hoot.

SPACECRAFT  Houston, Challenger.

CAPCOM      Roger, go ahead.

SPACECRAFT  Yes John, I just wanted to see if, well if we had you with us and if you saw the IMU alignment angles?

CAPCOM      We didn't see the angles, we're interested in the data.

SPACECRAFT  Okay, I'll read them to you when you're ready.

CAPCOM      GNC is ready.

SPACECRAFT  Okay, stars, it was a roll star tracker align, it was stars 25 and 15, angle error 0. I'll read the delta angles, reading across all the X's, -0.04, -0.16, -0.04. Reading across the delta Y's, +0.08, +0.02, -0.10. The delta Z's, +0.08, -0.11, +0.18. Execution time, 3/18:08:37.

END OF TAPE
CAPCOM: Challenger, Houston, be advised you do not have to do any cabin maintenance this morning, your environment looks good. We show your cabin at 10.31.

SPACECRAFT: Okay, I guess we tricked you, John. We did that first thing when we got this morning. We got up and the cabin was 10.1. And so we did a N2 repress, because we had -- I'm just calling it up now, we had a PP02 of 2.78, I guess was our number, so we repressed using N2 up to 10.4.

CAPCOM: Roger, good show Hoot, EECOM's smiling down here.

SPACECRAFT: Okay.

CAPCOM: Challenger, Houston. In order to maximize our Ku coverage this morning before we go EVA, we would like you, if it's agreeable with you, to go to a tail forward attitude instead of the nose forward and we can do that by selecting an omicron of zero.

SPACECRAFT: Okay, that's is that pre EVA John, that you want to do that?

CAPCOM: We want you to do that now. In other words, select an omicron of zero and then reinitiate the track to get us into a tail forward attitude but we'll get out of it prior to going EVA. And we need you to take the encryption to bypass. We're handing over back to TDRS.

SPACECRAFT: Okay, I understand John, omicron zero, encryption going off.

CAPCOM: Challenger, Houston, we're going LOS, see you at Yarragadee at 18 plus 57.

SPACECRAFT: Okay.

PAO: This is Mission Control Houston, we're LOS presently, pick up again through Yarragadee in 7 and a half minutes. Right now the Flight Director, Randy Stone, is getting the weather briefing, the substance of which is that weather is good throughout all the main landings in the United States -- landing sites for deorbit opportunities today with the possible exception of Kennedy Space Center, which has some low level turbulence. Postsleep activity dominating the early morning
crew activity plan onboard the Challenger this morning which has to do with the stowage of gear, preparation for the day's activities by gaining the access to the principal documents for today's use, the EVA checklist, EVA prep materials, breakfast, and configuring the cabin lighting and windows for the day's activities. Mission Elapsed Time is 3 days, 18 hours, 50 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through Yarragadee for 6 and a half minutes. Challenger, Houston is with you over Yarragadee for another 5 minutes.

SPACECRAFT Roger, Houston, you're coming in broken.

CAPCOM Roger, understand, coming in broken, and so is your return line.

SPACECRAFT We're on the edge of coverage.

CAPCOM Roger that. Challenger, Houston. We are 1 minute to LOS Orroral, we will see you TDRS at 19 plus 28.

SPACECRAFT Roger, John, we just got a great view of Australia.

CAPCOM Roger, that.

END OF TAPE
CAPCOM         - - plus 28.

SPACECRAFT    Roger, John. We just got a great view of
              Australia.

CAPCOM         Roger that.

PAO           This is Mission Control, Houston. We're advised by
              the Goddard Tracking network that the ground station at
              Dakar is not going to support this pass. At approximately
              MET of 3 days, 18 hr, 37 min, Dakar experienced a power
              dropout. There were some surges on its primary power
              sources. They went to backup power, and as of right now,
              they still haven't recovered and we're advised not to
              expect support from Dakar during the current pass.
              Challenger now over the mid south Pacific Ocean on orbit-
              - ascending node of orbit 61 at Mission Elapsed Time, 3
              days, 19 hr, 20 min. And we'll acquire through the TDRS
              system in about 7 min. This is Mission Control, Houston.

CAPCOM         Challenger, Houston is with you through TDRS.

SPACECRAFT    Roger, Houston.

PAO           This is Mission Control, Houston. We're taking
              data through the TDRS system at Mission Elapsed Time, 3
              days, 19 hr, 30 min, and it looks as though Mission
              Specialist, Bruce McCandless, has got the EVA suits of the
              Extravehicular Mobility Units up and running. The
              batteries have been charged and topped off, and probably
              within the next 30 min, McCandless and Stewart will
              begin donning the EMU's in preparation for today's EVA.
              Mission Elapsed Time, 3 days, 19 hr, 31 min, this is
              Mission Control, Houston.

CAPCOM         Challenger, Houston. If somebody's free, we have a
              request for you.

SPACECRAFT    Okay. Go ahead, John.

CAPCOM         Roger, Hoot. Two options, your call. If somebody
              would like to read down the MMU temp data to us off of
              SPEC 77, we'll take it that way, or you can load some
              new TPL's for us, and I'll give you the numbers, and we'll
              get the data ourselves. Your call.

SPACECRAFT    Okay. If you're ready to copy, John, I can give
              you the MMU values and temperatures.

CAPCOM         Ready to copy, Vance.

SPACECRAFT    And this will be port starboard, port starboard,
              port starboard all the way down.
CAPCOM Understand.

SPACECRAFT FSS left plus 7 plus 68. Right plus 63 plus 68. MMU left plus 41 plus 38. Right plus 37 plus 39. GN2 tank barrel left plus 42 plus 41. Right plus 40 plus 41. Control electric (garble) assembly plus 49 and plus 48.

CAPCOM Roger. We have all the data. Thanks, Vance.

SPACECRAFT Houston, Challenger. Radio check.

CAPCOM Roger. Loud and clear, Bruce. You're coming through a little broken, but loud and clear.

PAO This is Mission Control, Houston. Commander Vance Brand read down those temperatures on the two Extravehicular Mobility Units, temperature and nitrogen pressures, and the EVA systems officer here in the control center pronounced those as good numbers, well within tolerances, and consistent with readings that have been received right along this mission. It's 3 days, 19 hr, 39 min Mission Elapsed Time, and we still have another 45 min remaining on this TDRS pass. This is Mission Control, Houston.

SPACECRAFT Houston, this is Challenger. Over.

CAPCOM Roger. Go ahead, Bruce. Loud and clear.

SPACECRAFT (Garble)

END OF TAPE
STSB-41-B AIR/GROUND TRANSCRIPT t183j 038:08:41 2/7/84 PAGE 1

SPACECRAFT Houston, this is Challenger, over.

CAPCOM Roger, go ahead Bruce, loud and clear.

SPACECRAFT Roger, John, Houston. A question regarding the mass spec EVA repair. Looking at the drawing and looking out the window here, we assume that what you're showing us is accessible from the starboard side of the Orbiter looking toward the mass spec, is that correct?

CAPCOM That's affirmative, Bruce.

PAO This is Mission Control, Houston at 3 days 19 hours 43 minutes Mission Elapsed Time. Bruce McCandless' call having to do with the mass spectrometer located in the payload bay. The teleprinter message this morning advised the crew that that would be one of their contingency activities during the EVA. The mass -- the problem with the mass spec is thought to be a micro-switch that's not opening and the remedy by the EVA astronauts will be to insert a probe into an opening between the micro-switch body and the switch cam lever and to pry on that mechanism to cause a lever to deform and activate. McCandless' question had to do with access to that, that device. 37 minutes remaining in this pass, this is Mission Control, Houston.

SPACECRAFT Houston, this is Challenger, over.

CAPCOM Roger, go ahead, Bruce.

SPACECRAFT Roger, (garble) on that question on which side the microswitch is on. We've got a couple of lights on here in the payload bay and the binoculars on so we can see it. I respectfully submit that instead of the probe and the hammer, it might be more appropriate if I just took a large jeweler's screw driver out there with me to do the bending operation. Over.

CAPCOM Roger, stand by Bruce and we'll come back with our solution of what we think of your suggestion.

SPACECRAFT Okay, what we're looking at, for the guys in the SPAS backroom, is from out of the (garble) which is on the starboard side of the Orbiter. We're looking back and we can see a (garble) gray metallic, looks like anodized aluminum or something like that, or maybe they're beryl titanium, support struts. Coming out of the middle, or at the pivot point on the starboard support leg, is something that looks like maybe a torque motor or a shaft position encoder or something like that. It's a silvery can about an inch and a half in diameter and about an inch deep, and above that and attached to or mounted very close to the gray support leg is a package about an 1/8 of an inch thick, 3/4 of an inch in the Orbiter's Z direction. There
are some wires coming out of it, and we take that to be the micro-switch. Over.

CAPCOM You have it, Bruce.

SPACECRAFT Okay, thank you. I'm going to give this copier back to Bob, I having all sorts of trouble with my comm, so when you come back with that answer for me, be sure to ask somebody to relay or ask them to get me on another comm here. Over.

CAPCOM Roger, that, and, Bruce, just for your information that's a real good interpretation you made of that picture we had to send up.

SPACECRAFT Okay, and what you really want me to do is to spring the release the microswitch so that it has a rotation less travel from the cam to open the circuit, right?

CAPCOM That's affirmative Bruce.

SPACECRAFT Okay, thank you.

CAPCOM Challenger, Houston. Be advised in about 5 minutes, we're going to be doing our troubleshooting check of the mass spec.

SPACECRAFT Okay, give us a call, because I'd like to watch it work.

CAPCOM Roger, Bruce. The command is set for 20 plus 00, that's in four and a half minutes. Challenger, Houston. Bruce, I have an update on that swivelling...

END OF TAPE
CAPCOM    Roger, Bruce the command is set for 20 plus 00, that's in four and a half minutes. Challenger, Houston, Bruce I have an update on that swiveling motion when you're ready.

SPACECRAFT  Go ahead John.

CAPCOM    Roger, Bruce. Payloads has informed us that we expect the swiveling should start at 20 plus 02 plus 40 and we believe that it'll go ahead and point in the X axis and then return to the Z axis if the microswitch is still broken.

SPACECRAFT  Okay.

SPACECRAFT  Houston, Challenger.

CAPCOM    Roger, go ahead.

SPACECRAFT  John, the swivel happened a little earlier than we were expecting it to, it went at about 20 and 30 seconds or so and so Bruce wasn't up here when it went.

CAPCOM    Roger, understand.

SPACECRAFT  And John, we seem to be getting a, the dual broadcast out of you again.

CAPCOM    Okay, how is it now?

SPACECRAFT  Yes, that's great now, thanks John.

CAPCOM    Challenger, Houston, we're on the call right now and we're about 30 seconds to...Challenger, Houston, we are on the Dakar UHF right now, we may not pick you up TDRS, if we don't, we'll see you next at Yarragadee at 20 plus 32.

SPACECRAFT  Okay, John, we copy, with you in Australia.

PAO       This is Mission Control, Houston. The ground control officer reports that pretty severe thunderstorms in Australia have rendered the Yarragadee and Orroral ground stations inoperative and unlikely that we will be able to acquire voice through Yarragadee or voice and data through Orroral.

CAPCOM    Challenger, Houston, be advised that we will probably not have contact with you on this pass at Yarragadee and Orroral Valley. We have had some ground station problems.

SPACECRAFT  Okay, John, we copy that, we won't see you in Australia.

CAPCOM    Challenger, Houston, if Bruce is available, whenever Bruce can get to the window, if you will let us know, we
will then send a command to swivel the mass spec.

**SPACECRAFT**  Stand by John.

**CAPCOM**  Roger, no rush. When he gets there, just give us a call and then we'll send the command and we have about 11 minutes before LOS TDRS.

**SPACECRAFT**  John, we're too busy now, so we'll just let it go.

**CAPCOM**  Roger, we understand, Vance.

**PAO**  This is Mission Control, Houston. The ground control officer advises that despite the storms in Australia, Yarragadee and Orroral have recovered sufficiently to provide voice communication during the next pass, but that the wide band data in Orroral is still inoperative so while we will have voice through Orroral, we'll get no data, and Yarragadee of course is a UHF voice only. Mission Elapsed Time, 3 days 20 hours 13 minutes, this is Mission Control, Houston.

**CAPCOM**  Challenger, Houston, we're going to be going LOS here TDRS in a minute and a half. We think Yarragadee and Orroral may be up, if not, we'll see you TDRS at 21 plus 05, hopefully at Yarragadee in about 10 minutes.

**SPACECRAFT**  Okay, John, we'll listen for you.

**PAO**  This is Mission Control, Houston. We're out of range of TDRS, we will acquire through Yarragadee in 8 minutes. It was earlier reported that Yarragadee and Orroral would be unavailable because of heavy storms that are now affecting...

END OF TAPE
PAC . . . out of range of TDRS. We will acquire through Yarragadee in 8 minutes. It was earlier reported that Yarragadee and Orroral would be unavailable because of the heavy storms that are now affecting Australia, but it turns out that we will have at least voice at both of those sites, no data through Orroral, however. Moreover Flight Director Randy Stone has relinquished the comm here in the Mission Control Center and Flight Director Dr. John Cox assumes flight control of the mission. Dr. Cox is charged with direction of the mission during the EVA period, and EVA preps now begin in earnest aboard Challenger and it becomes appropriate for him to resume flight control. Standing by through AOS TDRS or AOS Yarragadee in 6 and 1/2 minutes at mission elapsed time, 3 days, 20 hours, 25 minutes, this is Mission Control, Houston.

PAC This is Mission Control, Houston. We're just about half a minute away from the acquisition through Yarragadee and an additional note, the CAPCOM during this EVA prep and EVA period will be Jerry Ross who has assumed duties at that console in relief of John Blake. It's MET, 3 days, 20 hours, 32 minutes. This is Mission Control, Houston, standing by for voice through Orroral for 8 minutes.

CAPCOM Good morning Challenger, Houston calling through Yarragadee. Challenger, Houston through Yarragadee for 7 and 1/2. Challenger, Houston with you through Yarragadee for another 3 and 1/2 minutes and we have a question on the heat pipe if someone's available.

PAC This is Mission Control, Houston. The ground control officer confirms we're getting a good uplink through Yarragadee but no response from the crew as yet. Mission elapsed time, 3 days, 20 hours, 37 minutes.

CAPCOM Challenger, Houston through Yarragadee in the blind for someone concerning heat pipe. We see the heat pipe power off on the ground. We would like it cycled back on. Item 21 execute on SPEC 220.

PAC This is Mission Control, Houston. Suspicion in the Control Center is that the crew has configured the UHF to the EVA mode, in which case they probably are not hearing these transmissions. We will have -- of course Yarragadee is S-band, or UHF only and we'll get voice through Orroral.

CAPCOM Challenger, Houston through Orroral Valley for 2 minutes.

SPACESHIP Good morning, Jerry, we got you loud and clear. How do you hear us?

CAPCOM Roger, we got you five square.
SPACECRAFT      Okay, we were hearing you at Yarragadee but I guess
              you probably weren’t hearing us back.

CAPCOM         That’s affirm, we were not. And, Hooter, for
              Bruce. His suggestion on using one of the screwdrivers from the
              inside is fine with us. Whatever he likes to do.

SPACECRAFT    Okay, sounds good John, we’ll pass that to him. He
              and Bob are in the EVA prep now.

CAPCOM         Copy that.

SPACECRAFT    Jerry, are you ready make a biomed check? We’ll be
              ready in about 2 minutes.

CAPCOM         Roger Vance. We will when we get to TDRS. We’ve
              only got another minute or so on this pass.

SPACECRAFT    Okay Jerry, we copy that. We’ll do the check on
              TDRS.

CAPCOM         Roger, we’re 50 seconds to LOS. TDRS is at 21:05.

SPACECRAFT    Okay, fine we’ll get it there. Okay?

END OF TAPE
CAPCOM: Challenger, Houston through TDRS.

SPACECRAFT: Roger, Houston. We copy you loud and clear, and we're into the RMS deploy, and we're working step 4.

CAPCOM: Copy that, Ron, and for the EVA guys, we got a good biomed check as you went over the hill at Orroral.

SPACECRAFT: Okay. Great.

CAPCOM: And also, a question on the heat pipe. Did you guys have to put the power back on, or was it on?

SPACECRAFT: Don't understand your question, Jerry.

CAPCOM: Okay, Ron. We made a call in the blind at Yarragadee requesting that the heat pipe power be cycled back to on. We saw an indication on the ground that it was off, and we were just wondering if you had to do that, or if it was a false indication on the ground.

SPACECRAFT: Okay, Jerry, we never heard that call. I wasn't aware that the power was off. I'll check and see.

CAPCOM: Okay. It looks good to us now, so it must have been a false indication earlier. Thank you, Ron.

SPACECRAFT: Okay.

CAPCOM: Challenger, Houston. We'll be sending you a new state vector, and I have your Ku times on EVA checklist, flight step 11-1 when you're ready to copy them.

SPACECRAFT: Okay. Stand by just a second, Jerry.

CAPCOM: Roger.

SPACECRAFT: Okay. I've got that page. I'm ready to copy.

CAPCOM: Okay, Hoot. I will give them to you by rev number, MET, and PET. First, rev 64, MET 23:08, a PET of minus 2 min. rev 65, 00:43 plus 01:33. Rev 66, MET 02:19, PET plus 03:09. Rev 67, 03:54 plus 04:44. Over.

SPACECRAFT: Okay, Jerry. Let me read the first two, and then I didn't get the second two. The first one, MET 23:08, rev 64, that was minus 2 min. The next one, rev 65, 00:43, and I think I copied plus 66 min, and then give me the other two again.

CAPCOM: Okay, Hooter. The PET for the rev 65, the second one, was 1 hr, 33 min. Rev 66, MET 2 plus 19, PET of plus 3 hr and 9 min. Rev 67, 3 hr, 54 min, and PET plus 04:44. Over.
SPACECRAFT All right. Let me try it again, Jerry. Rev 66, time is 2 plus 19, make that 2:19, and PET of 3:09.

CAPCOM That's correct, Hoot.

SPACECRAFT Okay, and then rev 67 was 3:54, and a PET of 4:44.

CAPCOM That's also correct, and the PET for rev 65 was 1 hr, 33 min.

END OF TAPE
SPACECRAFT ... okay and then rev 67 was 3:54 and a PET of 4:44.

CAPCOM That's also correct and the PET for rev 65 was 1 hour, 33 minutes.

SPACECRAFT Okay, PET on rev 65, 1 hour, 33.

CAPCOM That's affirmative and, Hooter, can you tell us what the comm problem appears to be on your end?

SPACECRAFT What comm problem are you referring to, Jerry?

CAPCOM I'm sorry, Hooter. It just seems that you're having a hard time copying me, so I figured you had some kind of comm problem.

SPACECRAFT No, we had good comm, I just mixed it up on some of the numbers.

CAPCOM Okay, copy that, thank you.

SPACECRAFT John. (garble), (garble).

SPACECRAFT Okay..

SPACECRAFT I don't hear you, Vance. You have to transmit.

SPACECRAFT Okay, your EV on?

SPACECRAFT EV1, EV2, how do you hear?

SPACECRAFT I hear loud and clear. Yes, I heard you now.

SPACECRAFT Very good.

SPACECRAFT And, it's the, you know the to the narrow side to the narrow side.

SPACECRAFT Now it's up. It comes down from the top. I saw it up there a minute ago.

SPACECRAFT Good copy there, definitely when I went in. And that one seemed to be a little hard, you have to push all the way and make sure the fingers clamp in on the side to lock. Yes, it's stiff netting.

SPACECRAFT Houston, this is EV1, you reading? Over.

CAPCOM Roger Bruce, we're reading your loud and clear. How me?
SPACECRAFT    Okay. I should be sending biomed now and Bob will be sending it in a couple of seconds. You can ask him to check.

CAPCOM    Roger, copy that Bruce. We got good biomed as you left Yarragadee, Orrora Valley, rather.

SPACECRAFT    Okay, so I understand we're both go on biomed.

CAPCOM    That's affirmative, Bruce.

SPACECRAFT    Okay.

SPACECRAFT    And Jerry, this is EV2, how do you copy?

CAPCOM    Roger Bob, I got you loud and clear, also. We got a little bit of background static on the downlink but everything's good.

SPACECRAFT    Okay.

SPACECRAFT    And the (garble) locked in also, Vance.

SPACECRAFT    Well, MET is go. Now here's the one where you call Ron and Hoot down to help also. We'll see. I'm just joking. They claim that the easiest way to do it is to lift the front up and match the, see the white lines on the ring? There some white lines on the waist also. You see those ... Just hold or ask Bob to hold that and try to rock the back up. Okay, but you're free to do it any way you want, of course.

SPACECRAFT    Okay, I'm pulling.

SPACECRAFT    Amazing!

END OF TAPE
SPACECRAFT Amazing.

SPACECRAFT Okay.

SPACECRAFT (garble) we decided the (garble).

SPACECRAFT There's a little strip that comes over (garble). And a motion back out of the cabin (garble) cargo bay. I think it's the only thing that stays in here with us. I'm not sure what that does.

SPACECRAFT Alright.

SPACECRAFT Those little brown straps, little brown straps.

SPACECRAFT Hey, Jerry you are in good TV viewing position and we've got some good Cinema 360 footage.

CAPCOM Okay, Ron, I don't copy all of that. I understand the arm is positioned and you did get some good 3, cinema 360 footage of it. And for the EVA guys, we're still hearing their conversations in the airlock, if they want to reconfigure.

SPACECRAFT I don't think they will probably stay in this configuration. Since now we got comm established, let's not lose it.

CAPCOM Okay, Bruce, the only advisory then is that the other guys onboard will have to try to work between your discussions over the cameras.

SPACECRAFT Okay, John, we copy that.

SPACECRAFT (garble) Vance.

SPACECRAFT (garble) make sure you (garble)

SPACECRAFT Houston, Challenger.

SPACECRAFT Lock it up. I'll get my hand in later.

SPACECRAFT (garble) let me try it again. Looks like there's a little, okay, just, just belt it in again. Yes, that's better.

END OF TAPE
SPACECRAFT  Feels like it has a little. Okay just put your ... belt it in again. Yeah, that's better. Hold off on that til we get to the check lock. (Garble) was outside in the biomed kit. Biomed is stuck on the galley over on (garble). Okay, close her up. Better lock, or engage, first. First you do. Beautiful. Leave it open til we get to the check lock. Flashlight battery? It's the one that appears first. You flopping that battery around too much? (Garble). (Garble). (Garble) he was flying a little bit. That's going to do it. Just a little more pressure. Yes, that's good like that.

PAO  This is Mission Control, Houston. The EVA crewmen are suited and in the airlock, and as an effect of that configuration, there's going to be a lot of sizzle and noise on the line and, unfortunately, it's something we're just going to have to live with until the EVA begins. Mission Elapsed Time is 3 days, 21 hr, 29 min. Have another 30 min on this TDRS pass.

SPACECRAFT  This is (garble) good.

END OF TAPE
SPACECRAFT They're securing good. (Garble) could you speak a little louder Vance.

SPACECRAFT Okay.

SPACECRAFT Okay and, Bob, why don't you turn yours back off for a second, let me get mine on and then. (garble) now, you don't have much clearance on the ceiling with that TV on. But the thing has got to come all the way down on the back of my head first to clear my eyeglasses. So the back has to come down first and then the front. Why don't you reach up there and pull on that, we can swivel it 90. There we go, that will help.

SPACECRAFT May have been some of that 180.

SPACECRAFT Yes. Yes, that's where they want it. Okay. Good.

SPACECRAFT Bruce, are you ready?

SPACECRAFT No, we'll wait, but I'm reading you.

SPACECRAFT Okay, 02 actuator IV.

SPACECRAFT In work. Okay, it's IV.

SPACECRAFT First, valve 2 closed and locked.

SPACECRAFT Okay, its closed and locked.

SPACECRAFT Okay.

SPACECRAFT S I can get Bob now. Here.

PAO This is Mission Control Houston. The power supply amperage readings here in the control center indicate that Mission Specialist Bruce McCandless has gotten into his EVA suit, the extravehicular mobility unit, and has secured it and has the fans turned on and we're getting some good data, some good readings on that. Now as I'm reporting that, I see EMU number 2, Bob Stewart's is also coming online so it appears that the two crewmen are in their EMU's, they're powered up and beginning the prebreathe. It looks like we're about 30 minutes ahead of the timeline, so conceivably then the EVA will begin 30 minutes earlier than predicted and earlier than shows in the timeline. And again, so far all the current, voltage, and temperature readings in the EMU's are completely nominal and all look very good.

END OF TAPE
PAO -- for all the current, voltage, and temperature readings in the EMU's are completely nominal, and they all look very good.

SPACECRAFT Cover your -- the springs that hold that. This cuff checklist is coming apart. The spring needs to be slid back into the middle. See, that set screw that's supposed to hold it there? That's the one they didn't lock tight. You just have to slide the spring part. You'll unloosen that little screw, Vance, then slide the spring, then tighten the screw. I'll tell you what, let's press on with getting the prebreathe going, and then we can work on that. I can hardly hear you. Yeah, okay. Can't hear you. Just try another unit, you're not transmitting at all. I can hear him out there. We can hear you out there, Vance, very weakly, but we can hear you. As long as you stay out there. Vance, you could get a hardline and hook up into this CCU in here -- if that's what you're on. Or we could go hardline too. Why don't we try hardline? Okay that's not either. Good. Okay. That was a big help. Okay, if you're still hearing me now. Okay. So, wrist rings are covered, waist rings are covered, time mode, EV1SA, well, hardlines, we'll have to get it back. (Garble). Got bad static. Okay, check power SCU. Okay, if I'm out here, I think it's okay. Deck fan on. The comm VOX. That purge valve 2, closed and locked. OP actuator -- depress. Recheck check suit pressure.

PAO There are -- this is Mission Control, Houston. The astronauts now performing leak checks on the --

END OF TAPE
PAO  This is Mission Control Houston, the astronauts now performing leak checks on the...

SPACECRAFT  ...4.2 to 4.4.

PAO  ...on the mobility units and checks look awfully good, doesn't look like there's any loss of pressure in the suits.

SPACECRAFT  Okay and, Bob, what did you say your pressure was? Okay, sounds good. Go to IV and then I'll time you for a minute. Start.

CAPCOM  Challenger, Houston, for Ron.

SPACECRAFT  Go ahead John.

CAPCOM  Ron, we'd like to get some Ku TV here. If you can ensure that the RMS wrist camera is selected, we'd like to operate the bay cameras for awhile.

SPACECRAFT  Okay, we'll configure that. Okay. Okay, Houston, Challenger, we got the cameras up and they're all yours. We had aimed the elbow camera earlier if you want to look at that one.

CAPCOM  Okay, we wanted to see what view we were getting out of the wrist camera and I'll see if INCO's happy with that, we may ask you to go back to elbow.

SPACECRAFT  Okay, let us know if you want it.

PAO  This is Mission Control Houston, we're looking out the end effector camera right now to see if there's any debris in the lens from having used that camera to watch the perigee kick motor from PALAPA during the firing yesterday.

CAPCOM  And Challenger, Houston, we'd like to go back to the elbow camera now, please.

PAO  And this elbow camera will be the color picture.

SPACECRAFT  (garble) elbow camera.

CAPCOM  Thank you.

PAO  Well, that's not it, obviously, that's here in the control center. And there's the elbow camera, color camera, looking down into the payload bay. That little flash of color in the lower left quadrant of the picture, right at the foot of the RMS, that's the mass spectrometer. Interestingly, from the tops of the canisters on the -- the tops of the get-away special cannisters on the starboard side of the payload bay show
reflections of the clouds as the Earth -- as the Orbiter passes over the Earth with the payload bay toward the Earth. You can barely see the blue sky and the cloud cover reflected in those canisters tops. This view from the alpha camera. The port forward -- port side forward bulkhead camera looking back toward the OMS pods and the vertical stabilizer with the closed sunshields from the Westar payloads assist module in the foreground. And dangling down from the top of the picture is the end effector from the remote manipulator arm. This is Mission Control, Houston. This is the delta camera, the stuck color wheel obscuring the upper half of the image of this camera and, of course, it's a black and white picture because that cover wheel refuses to rotate. There's alpha camera once again showing the Earth. The Earth's at the top of the screen here, the Orbiter just now over the continent of Africa and directly over Zambia at this time. Trajectory will carry it part of -- to Zimbabwe, Mozambique, and across to Madagascar.

CAPCOM Challenger, Houston. We're starting to drop in and out on TDRS, we're 4 and a half minutes to LOS, Yarragadee is next at 22 07.

SPACECRAFT Roger, and we're purging light now.

CAPCOM Roger, copy, thank you.

END OF TAPE
CAPCOM  Challenger, Houston, we're starting to drop in and out on TDRS, we're 4 and a half minutes to LOS. Yarragadee is next at 22 07.

SPACECRAFT  Roger, and we're purging right now.

CAPCOM  Roger, copy thank you. Challenger, Houston, we're about a minute LOS TDRS, we may not get you at Yarragadee, Hawaii at 22 34. And because of the purge operations on the suits, we see you're getting PP02 messages. Recommend channel 4 be set to 10.8, channel 34 to 3.2 and channel 44 to 3.1. Over.

SPACECRAFT  Okay, John, we were watching that and we thought that that was due to the purge also. We'll change 4 to 10.8, 34 to 3.2, 44 to 3.1.

CAPCOM  Roger that, see you probably at 22 34. We'll try at Yarragadee also.

SPACECRAFT  Okay, we'll see you there, John.

PAO  This is Mission Control, Houston, at Mission Elapsed Time 3 days 21 hours 59 minutes. We propose to cancel the scheduled 9:15 change-of-shift briefing with flight director Randy Stone. Stone was on console for only about 3 and a half hours this morning before being relieved by the EVA flight director, John Cox, so inasmuch as he had a brief and uneventful shift, and in addition to that the press conference would fall in the middle of the EVA, which certainly doesn't seem to make a lot of sense to distract media attention from that event. We have proposed to cancel that scheduled 9:15 press conference. We'll pick up a signal again through Yarragadee on orbit 63 in about 7 minutes at Mission Elapsed Time 3 days 22 hours. This is Mission Control Houston. This is Mission Control Houston. No voice through that Yarragadee pass, we'll acquire again in 17 minutes through Hawaii. Prebreathe has begun, the crew went into prebreathe about 30 minutes early. There are no plans to commence the EVA early, however, this will really constitute a prebreathe period of 30 minutes longer than originally timelined. But the EVA crew did move gingerly along its timeline and is ahead of schedule but the EVA will begin on time. Mission Elapsed Time is 3 days 22 hours 17 minutes, we're 16 minutes from AOS Hawaii on the 63rd orbit of the Earth. This is Mission Control Houston. This is Mission Control Houston, we're a minute and a half away from acquisition of signal through Hawaii, about a 6 minute pass over that ground station. Flight director John Cox just instructed his control team to make a last hard look at their systems information during this data take to assure that everyone is a good for EVA. Egress nominally should occur in about 35 minutes, 35 to 40 minutes and we are less than a minute away from acquisition of signal. At Mission Elapsed Time 3 days 22 hours 33 minutes, this is Mission Control Houston.
CAPCOM    Challenger, Houston, with you through Hawaii for 6 minutes, we have approximately a 1-minute key hole, 1 minute into the pass.

SPACECRAFT   Okay, we copy that Jerry. Jerry, we got a question back on the S-band SM. We would like to put the antenna switch in receive lower, receiver upper transmit -- receive lower, wait, transmit lower. I'll try and get this right. Transmit lower, receive upper.

CAPCOM    Stand by.

SPACECRAFT   And that's to optimize the EMU TV.

END OF TAPE
SPACECRAFT  -- receive -- transmit lower. I'll try and get this right. Transmit lower, receive upper.

CAPCOM  Standby.

SPACECRAFT  And that's to optimize the EMU TV.

CAPCOM  Challenger, Houston for Hoot.

SPACECRAFT  Go ahead, Jerry.

CAPCOM  Okay, Hoot. I'd rather stay in GPC until the guys get outside and turn on the cameras, and then you can go to that configuration.

SPACECRAFT  Okay. We'll stay GPC for now. And Houston, Challenger.

CAPCOM  Go ahead, Vance.

SPACECRAFT  Okay, I can bring you up to date on a couple of things. Purge, that was at 21 hr, 46 min. The prebreath start was 21 hr, 55 min.

CAPCOM  Copy those.

SPACECRAFT  We've had quite a bit of static on RF, so, at the present time, the EVA crewmen are on hardline.

CAPCOM  Roger. Copy that also.

SPACECRAFT  And we'll be ready for your comm checks on RF whenever you'd like.

CAPCOM  Okay. Let's get through the keyhole here, and then we'll be ready.

SPACECRAFT  Okay.

CAPCOM  Challenger, Houston. We would like to take Ku to command, please.

SPACECRAFT  Okay. Standby one.

CAPCOM  Challenger, Houston for Vance. We're ready for the comm checks.

SPACECRAFT  Okay. Standby one.

SPACECRAFT  Okay, Houston, you should be configured. How do you read?
CAPCOM: Okay, Vance. I got you five by. EVL, Houston calling. How copy?

SPACECRAFT: Houston, this is EVL. How do you read?

CAPCOM: Roger, Bruce. Loud and clear. EV2, Houston.

SPACECRAFT: Houston, you're loud and clear.


SPACECRAFT: And by the way, most of the noise went off when we turned the airlock's audio power off, so it must be coming on ICOM.

CAPCOM: Okay. Thank you.

SPACECRAFT: Jerry, I've got another comment on that. When I'm floating free in the locker, I get a lot of static when I use my feet to wedge myself firmly and ground off this AAP real good, then the static goes away.

CAPCOM: Okay. That's what some of the guys on the ground have been telling us also. Thank you.

SPACECRAFT: Okay. Comm check's complete, airlock's audio power, going back to audio tone, and we might as well stay on the RP, I guess. (Garble) looking through that all the time. We're getting a lot of noise again, Vance. Well, we can go back to hardline. I think it's going to go away and clear up once we get out of contact with these walls, Vance. Okay, we'll go back to hardline.

CAPCOM: Challenger, Houston. Going LOS TDRS in a minute and a half.

SPACECRAFT: Roger, Jerry, and advise that the prep has been very nominal. Other than the static, we haven't come across any problems at all.

CAPCOM: Copy, Vance.

PAO: This is Mission Control, Houston. We have about a minute between coverage from Hawaii, then to TDRS. Vance Brand reporting the normal EVA prep, and reported that the crew began prebreathe at a Mission Elapsed Time of 3 days, 21 hr, 55 min. We're less than a half an hour from egress, and that would give the EVA crewmen around 35 min prebreathe beyond the nominal. The plan was to have 40 min prebreathe. Looks like the actual will be nearer 75 to 80 min, which —

END OF TAPE
...will give the EVA crewmen around 35 minutes prebreathe beyond the nominal. The plan was to have 40 minutes prebreathe. Looks like like the actual will be near 75 to 80 minutes which is of course prudent and further reduces the chance of the onset of bends. We'll have AOS in about 20 seconds through TDRS at Mission Elapsed Time 3 days 22 hours 41 minutes this is Mission Control Houston.

CAPCOM Challenger, Houston, with you through TDRS.

SPACECRAFT Roger, loud and clear. And Houston, Challenger.

CAPCOM Go ahead.

SPACECRAFT It looks like we're coming up on a PET of minus 26 minutes, we've been prebreathe for a little over 48 minutes, looks like we'll start getting busy closing the hatch and preparing to depress at about 15 to 17 minutes minus PET. Over.

CAPCOM Okay, Vance, copy that, we concur.

SPACECRAFT And in the meantime, how would it be if we do that translation check, just to check out thrusters?

CAPCOM Roger, Vance, we're ready to watch.

PAO This is Mission Control, Houston. Challenger commander Vance Brand reporting that...

SPACECRAFT And EVA 1 and 2 you may feel a few thruster firings.

PAO Mission Control, Houston. Vance Brand reporting that the airlock hatch will be closed and the depressurization of the airlock will commence in about 10 minutes or less.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead Vance.

SPACECRAFT Okay, we called all of the pulses except for the one in the body plus X direction. If you can look, would you see if we got that and we'll try again if you'd like.

CAPCOM Okay, stand by, we'll get an answer. Challenger, Houston, for Vance, we'd like to see it one more time Vance.

SPACECRAFT Okay, I'll give you the vernier, or rather than normal body plus X one more time.

CAPCOM Roger, we're watching.
Okay, we saw it.

Roger, copy, Vance.

And Houston, we'll do a vernier rotation with the hand controller and then we'll be finished.

Okay, Vance, we're standing by to watch those also.

Okay, that's complete and satisfactory, thank you.

Okay, Vance, thank you.

Houston, Challenger.

Go ahead.

Yes, Jerry, we just got an SM alert, G23 OMS RCS quantity and we had it up there on OMS to RCS quantity at 7.73 percent. I assume that's okay to press on.

That's affirm, Hooter.

Okay.

This is Mission Control Houston, we're standing by to watch for cabin airlock...

END OF TAPE
CAPCOM    That's affirm, Hooter.

SPACECRAFT    Okay.

PAO    This is Mission Control, Houston. We're standing by to watch for cabin airlock depressurization. Indications on the data stream here, inasmuch as Mission Commander, Vance Brand, projected, the depress would occur any time starting now within the next 2 min. Mission Elapsed Time is 3 days, 22 hr, 52 min. We have about 41 min contact through TDRS still ahead of us.

PAO    Mission Control, Houston. That beeping I believe to be just some spray of signal from some unidentifiable ground source, probably out in the Gulf.

END OF TAPE
CAPCOM            Challenger, Houston.
SPACECRAFT        Houston, Challenger, were you calling?
CAPCOM            Yes sir, are you receiving the morse code onboard as well?
SPACECRAFT        Yes, we sure are, Jerry. We're receiving morse code, we're getting an in and we get a dah de dah da. And a chen a dah dah did. I don't remember what those two are.
CAPCOM            Okay, we got a suggestion for you that you may want to take the EVA guys to alpha and bravo. We think that will cut that out.
SPACECRAFT        Okay understand, take the EVA guys to alpha and bravo. Okay EV1 is on alpha.
CAPCOM            And if we can get Bob to bravo, we think that'll stop it.
SPACECRAFT        Bob, are you on bravo?
SPACECRAFT        Okay Houston, that sounds good, that seems to have fixed it.
CAPCOM            Roger, thank you Bob.
SPACECRAFT        Bob?
SPACECRAFT        Bob, are you on bravo?
SPACECRAFT        Yes.
SPACECRAFT        Give me a long count.
SPACECRAFT        1, 2, 3, 4, 5, 5, 4, 3, 2, 1.
SPACECRAFT        Okay, okay. Okay, how do you hear me, Bruce, Bob?
SPACECRAFT        Loud and clear.
SPACECRAFT        Okay, I'm going to close the hatch if you're happy with your position.
SPACECRAFT        Hold one second. Let's see, where'd the camera go?
SPACECRAFT        There's one over here near the hatch.
SPACECRAFT        On the handrail?
SPACECRAFT        Yes, right.
SPACECRAFT Okay. Yes, that's good. Hang loose. There you go, lift that way up.

SPACECRAFT Okay.

SPACECRAFT Okay. If you're happy, I'll close the hatch.

SPACECRAFT Go ahead.

SPACECRAFT (Garble).

SPACECRAFT And whose got, I've the got the depress cue card over here.

SPACECRAFT Okay. This is not the greatest place for (garble).

SPACECRAFT Okay the dogs look good to me, how do they look to you, Bob?

SPACECRAFT Take them on in. Good.

PAO This is Mission Control, Houston. Vance Brand reporting the hatch is closed at 3:23:02 mission elapsed time, hatch closed and locked. The dogs they referred to are the clasps that secure the hatch.

SPACECRAFT You got the cover off the depress valve?

SPACECRAFT Yes, it's off.

PAO Have a momentary data drop out here in the control center but we'll continue to look for decrease in the airlock pressure as soon as data comes back.

SPACECRAFT Roger. (Garble) from 44 and 3, (garble).

PAO Airlock pressure decreasing down to 9.6 psi.

SPACECRAFT Airlock press, 9.5 going down 9.4, going down.

SPACECRAFT 8.8, 8.4.

SPACECRAFT Houston, Challenger, I'm willing to inhibit the camera. Over

END OF TAPE
SPACECRAFT  Airlock press 9.5 going down, 9.4 going down. 8.8, 8.4.

SPACECRAFT  Houston, Challenger, I'm going to inhibit the camera overtemp message at this time.

CAPCOM  Okay, Ron, copy that (garble).

SPACECRAFT  7.8.

SPACECRAFT  I'm still in IV, is that correct?

SPACECRAFT  That's correct.

SPACECRAFT  Thanks.

SPACECRAFT  7.0, I'm getting that tone, every time I talk. I get a message at 6 that says the airlock (garble).

SPACECRAFT  Airlock's at 6.

SPACECRAFT  (Garble) When we get to 5, we're going to close the depress valve. 5.4, 5.3, 5.2, 5.1, okay, close it.

SPACECRAFT  Depress valve is closed.

SPACECRAFT  Okay, we're stopping at 5. I'm not getting a very loud tone. Let's go ahead with the leak check. That is leak check, (garble) going to set O2, OFF. Leak check (garble).

PAO  This is Mission Control, the EVA crewmen are making some leak checks in the airlock now, cabin pressure and cabin take, cabin integrity is --

SPACECRAFT  Leak check complete.

PAO  -- obviously very good and following this they will take the extravehicular mobility units and put them on internal power.

SPACECRAFT  Reg set O2 tn EVA.

SPACECRAFT  Okay, let's set O2 to EVA.

PAO  Airlock pressure at 5.0 and leak checks in progress before reducing the pressure further.

SPACECRAFT  O2 is EVA

SPACECRAFT  Likewise O2 is EVA and we're holding on PET 0 now for battery.
And that's only two minutes and 40 seconds away from now.

Okay, well give us a countdown to it Vance, that's the way I'll set our clocks.

Okay, a couple minutes, we'll do that.

In the event we're to go to full (garble) at this time, Bob.

Okay. I'm full (garble). I can't stay there long though.

Yes, you're right. (Garble)

(Garble) go.

(Garble)

Okay, about 50 seconds til PET 0.

Okay, we'll go to battery on your mark.

Okay, 20 seconds and go. 10, 6, 5, 4, 3, 2, 1, MARK, battery's on.

Okay, we're on battery.

The EMU's are on internal power now, independent of the orbiter.

(Garble) power battery charger EMU 1 and 2 bus select switch to OFF.

And the current levels look fine.

EMU bus select switch, both OFF.

Okay, over there on the other—
PAO: -- and the current levels look fine.

SPACECRAFT: And EMU bus select switch both off. Okay, over there on the other side, 82B, EMU 1 and 2 02 valves to close.

SPACECRAFT: 02 valves are closed. Disconnect SCU. I'm going to stow mine on the handrail. You can stow yours wherever you deem appropriate. (Garble) test. Okay loud and clear. Yeah, boy my squeal went away. Are you backed into me? Yes. Okay, here you go I need lean over here a second. In fact, I may velcro into your AAP mounts, since I sure don't want to block that hatch. Okay. Close D&C cover. Closed. Okay, status per cuff checklist, number 1. (Garble). A status check, we're check your (garble) against the cuff checklist. IMEV is 02 minutes. Are you reading us, Vance? Yes. Go ahead with the pertinent things (garble). (Garble) 6 plus 50, (garble), suit pressure 4.2, 02 855, SOP 6190, batt (garble) 18.7, batt amps 1.4. (Garble) amps. They're a little high for right now, but we're still not down all the way. Okay, let me, just give me time EV and percent power. Okay. We want to run through the whole thing once here. 20,000, .3, 70. What do you read for batt amps, Bob? Standby. 4.0. Okay, I'm reading 4.4. Let's pressed. Bob, can you give me time EV, time left, percent power, percent 02? Time EV is 4 min, time left 650, 99 percent power. 100 percent 02. Are we in contact with the ground?

CAPCOM: That's affirm, Bruce, we're copying.

SPACECRAFT: Yeah, Jerry, sitting here at 5 psi in the airlock, I'm reading 4.4 amps on the batt. Bub was reading 4.0. We think they'll go down when we get down to vacuum.

CAPCOM: Roger. We concur with that, Bruce.

SPACECRAFT: Okay, Bob, airlock depress valve to the big hole's open. Okay, and we're going down.

CAPCOM: Control Center data shows the airlock pressure declining, decreasing.

SPACECRAFT: 349. (Garble). Pressure's holding steady at 5. (Garble). That's just because the rate is slowing.

PAO: Airlock pressure now 1.8 psi, and still decreasing at a slower rate now.

SPACECRAFT: 1.7.
CAPCOM NASA select video from the elbow camera on the remote manipulator arm looking down into the payload bay showing the airlock hatch. Airlock pressure at 1 psi right now. The crew would be configuring their waist tethers for egress very soon, and will (garble) the hatch release momentarily — —

END OF TAPE
Airlock pressure is at 1 psi right now. The crew would be configuring their waist tethers for EGRESS very soon and will begin the hatch release momentarily, pressure now reads .6 psi and as soon as it is less than .5 they will begin to initiate opening the hatch, it is now .5.

SPACECRAFT 0.8 in the hatch, equalization valve is I think about 0.8 also.

PAO Cabin pressure now showing between .3 and .2 psi. May open some initial valves here to expedite the release of the last remaining pounds or fractions of pressure. Pressure now shows .2 psi. NASA select showing the delta camera looking back at the get-away special cannisters and the --

SPACECRAFT in the hatch valve.

PAO -- German SPAS.

SPACECRAFT Let's go ahead and (garble).

PAO About 14 minutes remaining on this TDRS pass.

SPACECRAFT It's showing .6 on my gage for it. What are you reading, Bob?

PAO McCandless reporting his pressure gage shows .6 according to his checklist, he's not suppose to open the hatch until, until he gets a reading of .2 as a prudent precautionary measure due to possible inaccurate in the gage.

SPACECRAFT Okay, I got 0.4 here and a .6 on mine so let's press.

SPACECRAFT Warning H2 is off.

SPACECRAFT Yes, likewise, okay, well I'll (garble) open. The outer hatch partially open, okay. The outer hatch is coming partially open.

PAO The astronauts are now in a space environment and the suit performance is good. They're still in the airlock and now partially opening the airlock hatch.

SPACECRAFT Outer hatch is partially open. Airlock depress valve to close.

SPACECRAFT Airlock depress valve is close.

SPACECRAFT Temperature control for max (garble).

SPACECRAFT (garble) max hot.
SPACECRAFT They're working on mine. My temperature control is max hot, next step as you can imagine, it better run, better run.

SPACECRAFT (Garble) on.

SPACECRAFT D&C blank, (garble) off.

SPACECRAFT That's off.

SPACECRAFT Okay here comes the other hatch open and still.

SPACECRAFT Okay we're looking for you.

PAO See the wrist or the elbow camera from the RMS showing the airlock hatch in the left center portion of the screen and then we should see that open momentarily.

SPACECRAFT Okay, it's open and stowed. Looks nice out there. Temperature control valve as required, status check cuff checklist, okay, IMU D 13 minutes, time left 7 plus 00, 96 percent power, 80 percent O2. (Garble) pressure 4.4, that's all you need isn't it?

SPACECRAFT Yes, you caught me by surprise, say it again Bruce.

SPACECRAFT Okay, IMU D 14 minutes, time left 7 plus 00 with 96 percent power limiting, you have --

END OF TAPE
That's all you need, isn't it?

Yes, you caught me by surprise, say it again, Bruce?

Okay, I IMU D 14 minutes, time left 7 + 00 with 96% power limiting. You have 100% O2. Pressure is 4.4.

Okay thanks. How about you, Bob?

(garble) 14 minutes, time left 7:40, 97% power, 100% O2.

Pilot, Hoot Gibson at the aft crew station. Orbiter now over south Africa approximately at the border between Namibia and Botswana.

Breaker, my guess you go by camera delta on your way to tether reel, you could probably try that pan tilt thing for them.

NASA select now showing the Man Maneuvering Unit.

(Garble), Jerry?

Challenger, Houston, we're approximately 6 minutes to LOS TDMS. We'll listen to you at Yarragadee. Next comm will be Hawaii at 00 plus 08.

Okay, Jon.

Vance, are you ready to copy the pressure gage readings?

Rog, ready to copy.

Okay on the starboard (garble), 2600.

Okay, got it, 2600 on the starboard.

Garble) on A 2750.

Okay Vance, over here on the port MMU, I'm reading 2800 on system A. And 1700 on system B.

Okay, copy.

Houston, Challenger, you still with us?

That's affirm, Vance, we're still here.

Okay, did you catch those GN2 pressure readings out
CAPCOM: That's a roger, we did that.

SPACECRAFT: Very good.

CAPCOM: And they sound good to us, Vance.

SPACECRAFT: Hey Ron, you want to try to stay in tilt?

SPACECRAFT: The MMU's condition is generally looking good.

SPACECRAFT: Okay Ron, here comes a tilt.

SPACECRAFT: That's good.

SPACECRAFT: Nothing.

SPACECRAFT: Okay, here comes pan.

SPACECRAFT: Very slow. (garble).

SPACECRAFT: Okay, it looks like it's still doing the same thing as before Bob.

SPACECRAFT: Yes.

SPACECRAFT: Okay, for the record, I cannot see any damage caused by the slidewire rubbing on the MMU.

SPACECRAFT: Okay, we'll note that.

SPACECRAFT: Okay Bruce, as you've already started to do, we had you in the MMU prep and Bob, you're installing the batteries, the power tool on the XBR after you look at the TV?

SPACECRAFT: 'Garble'

END OF Tape
SPACECRAFT -- as you already started to do we have you into
MMU prep and Bob you're installing the battery and the power tool
on the MFR after you look at the TV.

SPACECRAFT (Garble)

PAO This is Mission Control Houston, the shuttle
pallet satellite has a 70 mm camera mounted onboard and the
payload officer advised that they saw data indicating that the
crew had taken a snapshot with that camera. Just a minute and a
half left of TDRS coverage here.

PAO This is Mission Control Houston, we're out of
range of the TDRS, McCandless and Stewart are clearly in the
payload bay and initiating some of the work objectives from the
crew activity plan at, it was clear that Bruce McCandless was
checking the pressure levels in the MMU's and Bob Stewart had
been over in the vicinity of the delta camera, checking it for
power supply and checking its range of motion. We'll acquire
signal again in 7 and a half minutes through Yarragadee, at
Mission Elapsed Time 3 days 23 hours 35 minutes, this is Mission
Control Houston.

PAO This is Mission Control Houston, we're a minute
and a half away from reacquisition through Yarragadee. At this
point the EVA crewmen should be preparing for the MMU testing.
Bruce McCandles will have made his way to the MMU mounted on the
port side of the ship, will donn a ranging aide then step into
the MMU and begin the checkout flight, Bob Stewart will be
preparing and unstowing the trunion pin adapting, trunion pin
attachment device and be preparing it for testing on later in the
EVA and will be --

END OF TAPE
PAO: -- be preparing and unstowing the trunnion pin adapting - trunnion pin attachment device, and be preparing it for testing later in the EVA. And we'll be observing the early tests done by Bruce McCandless with the MMU. And we should have voice in about half a minute at Mission Elapsed Time, 3 days, 23 hr, 41 min. This is Mission Control, Houston.

SPACECRAFT: Okay, you got 2 open, Bruce. Good. Okay. (Garble) going after those, and we're going into the dark.

PAO: Mission Control, Houston. Yarragadee is UHF only, so we're picking up only the Orbiter during this pass. Vance Brand's remark about going into the dark --

SPACECRAFT: (Garble) got the MMU port heater A and B open.

PAO: Brand's remark reflecting that the Orbiter is just crossing the terminator from daylight into darkness.

SPACECRAFT: Take a look at the sunset from outside. (Garble) stow the external thermal cable now. (Garble) 35 ft tether sure tends to get snagged on everything.

PAO: This is Mission Control, Houston. We're out of range of Yarragadee presently, and will reacquire through Hawaii in 16 min. EVA sysms officer reporting that the EVA crew is about 10 min behind the timeline. They're still involved in the MMU preps and that Bruce McCandless has yet to free the MMU from its mounting and begin a slight test of that system. Orbiter's position at this time is flight with its tail to the Earth, 40 deg off vertical. The payload bay is opposite the velocity vector, meaning that the Orbiter is essentially flying with the underside, the thermal protection system into the velocity vector. At Mission Elapsed Time, 3 days, 23 hr, 53 min, this is Mission Control, Houston.

PAO: This is Mission Control, Houston. We're about a minute and a half away from acquisition of signal through Hawaii on orbit 65. Bruce McCandless should be completing the MMU donning and checkout procedure as outlined in his activity plan. That, essentially, is verifying that the tethers are clear and backing into the MMU so that the MMU and PLSS latches engage with the MMU constraint.

END OF TAPE
PAO    -- they're verifying that tethers are clear and backing into the MMU so that the MMU and PLSS latches engage with the MMU constraint and pulling down the rings which have the effect of freeing those latches. Just to verify that the, it's possible to secure and release from that system. He will then attach a lap belt, configure valves in their power system's lights and levers on the MMU. Remove and stow safety tether, put the arms in the flight position and make some thruster firing tests with a variety of power on and off configurations. And --

SPACECRAFT    What's the wire hung up, Bob? (Garble). Gee whiz, if you'd told me that, I could have reached that.

SPACECRAFT    (garble) state vectors.

SPACECRAFT    Okay thank you. Thank you very much.

CAPCOM    Challenger, Houston with you at Hawaii for 8 minutes.

SPACECRAFT    I heard you, Jerry. How are you reading?

CAPCOM    Roger, Bruce, loud and clear.

SPACECRAFT    (Garble) may have been one small step for Neil, but it's a heck of a big leap for me.

CAPCOM    Roger, copy that, Bruce.

SPACECRAFT    Okay Bruce, we see you on port.

SPACECRAFT    (Garble).

SPACECRAFT    Hey great.

PAO    This picture from the wrist of the elbow camera, on the MMU, on the RMS.

SPACECRAFT    (Garble) for about 60 seconds when you get a chance to go up by, not too much pressure (garble)

SPACECRAFT    (garble)

SPACECRAFT    You can feel the thrusters banging a little bit here.

SPACECRAFT    We could feel them when you were checking it out in the SS3 Bruce?

SPACECRAFT    Really? That's neat.

SPACECRAFT    You look real stable out there.
PAO        McCandless has maneuvered the MMU to a position
where he's looking right into the windows into the aft crew
station on the flight deck.

SPACECRAFT  (Garble) cue lights down a little more. At least
in the darkness, they seem to be quite visible.

SPACECRAFT  When you get ready for the checkout flight,
Bruce. Remember start out first in the prime mode stuff.

SPACECRAFT  Yes, I am in prime mode.

PAO        McCandless will now make a 3-axis check of the MMU
system.

SPACECRAFT  (Garble)

PAO        Maneuvering left to right, forward, back and up and
down.

SPACECRAFT  Okay, here's a plus roll. Roll, that yaw
(garble). I think I'll give you a little bit of everything and
stop them with attitude roll. Okay, Jerry, starting (garble) to
roll.

SPACECRAFT  Houston, Challenger.

CAPCOM     Go ahead, Vance.

SPACECRAFT  Jerry, Bruce started out this run with 2700 lbs psi
in A and B sides of the MMU.

CAPCOM     Copy that, Vance and we're getting some super TV.

SPACECRAFT  Good, he's right outside our window here. Looks
great.

END OF TAPE
CAPCOM        Go ahead Vance.

SPACECRAFT    Jerry, Bruce started out this run with 2700 lbs psi in A and B sides of the MMU.

CAPCOM        Copy that Vance and we're getting some super TV.

SPACECRAFT    Good. He's right outside our window here, looks great.

SPACECRAFT    Attitude roll, okay. B going off and B coming on. (Garble)

SPACECRAFT    Backup A and B and then of course the EMu checklist (garble).

SPACECRAFT    (Garble) from a minus (garble) I'm getting a little bit of a positive roll, plus Y I get the opposite little negative roll. Here's Z. No particular (garble) Somebody bump me? I bumped into, Bob, I'm sorry. Okay, she checks out good. How long till sunrise? Anybody?

CAPCOM        That's affirm.

SPACECRAFT    I think you have about 8 minutes of darkness yet Bruce, maybe you want to fly up and down a bit.

SPACECRAFT    Yes, that's what I was thinking, let me drive on back to the, the starting of the PAMs and see what they look like.

SPACECRAFT    Bob, how is it going with that (garble)?

SPACECRAFT    (Garble) is ok, it's getting into and out off the foot restraint (garble) took me 4 minutes to get in this (garble).

SPACECRAFT    Yes, Bob, you keep cutting out, clipping, we just get little bits of your conversation.

SPACECRAFT    Vance, I said there the problem (garble) is getting into and out of this foot restraint. It doesn't fit at all.

PAO           Mission Control Houston, 4 days, 0 hours, 17 minutes, Mission Elapsed Time, we've lost the tv picture thru the Hawaii station. We'll be picking up in a few minutes over the Goldstone station.

SPACECRAFT    Bill, the old Biffer is still here. It seems to have come thru in great shape.
CAPCOM      Challenger, Houston back with you thru TDRS, we'll be getting tv shortly thru Goldstone.

SPACECRAFT   Roger, Houston.

SPACECRAFT   And Houston, I've got a VTR record button stuck on the RMS camera, unable to select any other cameras. I'll take any suggestions you have for it.

CAPCOM      Copy that Ron, we'll --

END OF TAPE
CAPCOM      Challenger, Houston back with you through TDRS. We'll be getting TV shortly through Goldstone.

SPACECRAFT  Roger, Houston. Houston I've got a VTR record button stuck on the RMS camera, unable to select any other cameras. I'll take any suggestions you have.

CAPCOM      Copy that, Ron. We'll think about that. And Bob, we have coming up next - you transferring him (garble).

SPACECRAFT  Okay, Vance, under a (garble).

SPACECRAFT  Bill, as far as comm dropouts go, I haven't run into any yet. Just for the record, I don't see any stars out here.

PAO          This is Mission Control. Astronaut, Bruce McCandless, --

SPACECRAFT  (Garble) problem. (Garble) foot restraint and (garble) the boot in it either. Yeah, I have to get in, (garble) real hard you have to force the heel under, and equally hard to get out. Okay, that applies at this foot restraint too. Okay.

CAPCOM      Challenger, Houston for Ron.

SPACECRAFT  Houston.

CAPCOM      Roger, Ron. We've got some procedures to try to recover the video tape recorder button, but we would like to go ahead and use the elbow camera for now to track Bruce during his long range translations. We'll try the recovery after we get out of ground site coverage for TV.

SPACECRAFT  Okay, Jerry. I'll stand by and wait for that. And Jerry, pass to Ed we sure have a nice flying machine here.

CAPCOM      Yes sir, Bruce. It looks like a real friendly machine, real solid, real stable, and looks like you did a good job with all that engineering work over those years, as well as Ed and the rest of the crew.

PAO          This is Mission Control. Astronaut, Bruce McCandless and the Manned Maneuvering Unit now gliding over the top of the Shuttle pallet satellite.

SPACECRAFT  And EVA'ers, how about a status check at the first convenient break point, here.

PAO          And --
SPACECRAFT  (Garble) suit pressure of 4. - let me start over. (garble). an hour and 12 minutes, time left 6:10, 83 percent power, and 90 percent O2. I either see stars or somebody just started a water dump. Must be sunrise coming up.

PAO    Astronaut-

SPACECRAFT  (Garble) seeing thos little guys each time the sun comes up.

PAO    Astronaut McCandless due to make his 150 foot translation from the Orbiter in just a few minutes.

SPACECRAFT  Okay, Jerry, we're recovered.

CAPCOM    Okay Ron, glad to hear that, thank you.

PAO      Capcom in Mission Control is Astronaut Jerry Ross.

CAPCOM    I have a lot of envious people watching you, looks like you're having a lot of fun up there.

SPACECRAFT  Yeah, it's working very nicely.

PAO      Astronaut Bruce McCandless in the first actual flight test of the man maneuvering unit. You can see the locator lights blinking on the underside of the man maneuvering unit.

CAPCOM    Ah Bob, can you give us a status check now?

SPACECRAFT  (garble)

END OF 'APE
PAO: You can see the locator lights blinking on the underside of the man maneuvering unit.

SPACECRAFT: Ah Bob can you give us a status check now?

SPACECRAFT: (Garble) 6 hours, 83% power, (garble) 802.

SPACECRAFT: Okay, I understood, 83% power, say again 02.

SPACECRAFT: (garble)

SPACECRAFT: We think we heard 87, Bob, your equipment.

SPACECRAFT: That's affirm, 87.

SPACECRAFT: Okay,

SPACECRAFT: Guess I'll have to holler real loud. Looks like daylight is upon us.

PAO: Astronaut Bob Stewart reading off the parameters of his EMU.

SPACECRAFT: Reading just about 2000 psi in system A as in alpha, and 1800 in system B as in bravo.

SPACECRAFT: Okay, copy.

SPACECRAFT: Bill, I'm going to head out over the bay, with your permission.

SPACECRAFT: Okay, Bruce, right on, why don't you give us a 150 foot short translation.

SPACECRAFT: Bill, do you have the TV ranging device working today? Out of curiosity.

SPACECRAFT: We'll find out how it's working shortly.

SPACECRAFT: Okay. Gees when you put in a for long translation, the thing shutters, and rattles, and shakes.

PAO: Bruce McCandless preparing to make his 150 foot s-journ, moving away from the Orbiter out to a distance of 150 feet and then returning, and then following that about 10 minutes later, he will go out to a distance of 300 feet.

SPACECRAFT: And Bob, we're not going to pay much attention to you for a little while here, while we watch Bruce go out in (garble).

SPACECRAFT: (garble) and prospective here on the Orbiter?
And Bruce would you like to turn the (garble) TV on?

Yes sir, (garble).

Okay Bruce, we have a good shot of the payload bay.

Great, this is neat.

This is a picture from the camera on the helmet of Bruce McCandless, looking back at the Orbiter as he slowly glides away from it.

Looks great, Bruce.

Thank you, I'm trying to see what sort of land mass that is we're coming up on. It looks like Florida, it is Florida, it's the Cape.

Yeah, you're on the state side, Bruce.

Oh, I got to see if I can get a picture of this.

You're not too far from Houston as a matter of fact.

And Houston, we have some helmet-mounted TV on now.

Roger we got a little bit of it earlier, Vance. Some super views.

I think when you get out further, Bruce, we'll be able to see the whole ship, right now we can see a corner of it.

Okay.
CAPCOM          Roger, we got a little bit of it earlier, Vance. Some super views.

SPACECRAFT    I think when you get out further Bruce, we'll be able to see the whole ship, right now we can see a corner of it.

SPACECRAFT    Okay.

SPACECRAFT    Look out there, Bruce.

SPACECRAFT    It's nice, the sun just came into my eyes, that's a little bright, but, not a big deal. Going over the Florida Keys, sort of. Okay, 1900 on the left, 1800 on the right. Let's see how this state of the art ranging device is going to work. Well, I show myself about 80 feet out, something like that. I could go faster but why rush it.

PAO            McCandless at a distance of about 80 feet.

SPACECRAFT    Found me on the TV ranger yet?

SPACECRAFT    Not yet.

PAO            He'll be going about twice that far out on this exercise.

SPACECRAFT    (garble) above the ship.

SPACECRAFT    Yeah, that's what I'm trying to do, verifying that it's working out.

PAO            McCandless in his man maneuvering unit, constitute a separate spacecraft of there own now.

SPACECRAFT    Well, you may get the name of the world's fastest human being, going along there at 4 miles a second, Bruce.

SPACECRAFT    The record will only stand I guess, for the next hour or so.

SPACECRAFT    Just past over Florida and Cuba.

SPACECRAFT    Well I guess to break it Robert, is going to have to go 10 percent faster.

SPACECRAFT    (Garble) like I've got enough (garble).

SPACECRAFT    I'm showing myself at about 95 feet right now. Maybe right at a 100. Got that ranger going yet.

SPACECRAFT    We've got you at 123 feet at about .3 feet per second.
Okay that sounds about right. We always seem to have about a 25 foot difference between what I read and what the simulator up at Martin with (garble) and all those guys came up with. Point 3, okay. Give it a little more --

SPACECRAFT (garble) what are you.

SPACECRAFT Houston Challenger

CAPCOM Go ahead Challenger.

SPACECRAFT Why don't you go ahead and take the cameras, I'm going to work the lasers, on camera's B and C.

CAPCOM Copy, we'll take the other cameras, you've got baker and charlie, Ron.

SPACECRAFT Okay, 145 feet, Bruce, at well a little noisy, around .3 yet.

SPACECRAFT Okay, why don't I try to come to a stop here.

SPACECRAFT Yeah, matter of fact you just hit 150 feet, so you'd probably better stop.

SPACECRAFT Yeah, I should be just about stopped now. And I'm reading 125, so yeah. You should have a ranger at just about 0 now.

SPACECRAFT We're seeing about .2.

SPACECRAFT Point 2? Okay. Okay, and I'll come on back in.

SPACECRAFT Great.

PAO MMU has a -

SPACECRAFT (Garble) it's real solid on stability.

SPACECRAFT Yeah, it really is and so far the only surprise is that, like I say, when I put on a +X for a couple of seconds, I feel a sort --

END OF TAPE
SPACECRAFT Real solid on stability.

SPACECRAFT Yes, it really is and so far the only surprise is that, like I say, when I put on a +X for a couple of seconds, I feel a sort of rumbling, rattling which I assume is interaction between the EMU and the MMU, but we hadn't expected it.

PAO MMU has 24 nitrogen powered thrusters. McCandless will begin returning to the spacecraft now.

SPACECRAFT Well, whoever it is that built these visuals did a great job.

SPACECRAFT Ok, 140 feet.

SPACECRAFT I perceive myself to be closing now, a couple of tenths of a foot per second maybe.

SPACECRAFT Ok, closing at, well, we really can't tell how fast you're closing, it's jumping around a little bit, but you're coming in, you're about 120 feet out.

SPACECRAFT Good.

SPACECRAFT And we're not picking you up on the radar for some reason, very well. We can't seem to track.

SPACECRAFT Well, I may be in a little bit closer - during the man mode and low power, and all that stuff?

SPACECRAFT Yes.

SPACECRAFT Maybe I should have eaten some of those cans for breakfast instead of just the food --

SPACECRAFT Yes, you're not reflective enough. And Bruce, is your EMU camera still on?

SPACECRAFT Yes Sir.

SPACECRAFT Somehow we lost (garble).

SPACECRAFT Bruce, are you going to take a picture of us?

SPACECRAFT Yes, I am, but it's going to be better on the next one, cause the sun angle is not all that great right now.

SPACECRAFT (Garble) this time and the next time.

SPACECRAFT Well, I've taken about 5.

SPACECRAFT Good.
SPACECRAFT: Ok, I'll take another one. I see Hub down there working on the DFR, getting it ready to go.

SPACECRAFT: It works.

SPACECRAFT: Very good.

SPACECRAFT: Ok, see how it works in there now.

PLA: Challenger, only 1 hour and 30 minutes to go, you are ready to return. Challenger, if I can see the television monitor, we'll have you back in the fire control.

SPACECRAFT: Ok, we're working to come back as soon as we can.

SPACECRAFT: Ok.

PLA: Making sure that you have all the windows here.

SPACECRAFT: Ok, we've got the windows here, and the windows here.

PLA: That's your reading from us.

SPACECRAFT: That explains it. Ok, you're on your time.

END OF TAPE
SPACECRAFT Okay, that explains it. Yes, you're 60 feet from
that camera. Okay say those numbers again?

SPACECRAFT 1800 A, 1600 B.

SPACECRAFT Okay.

SPACECRAFT Are you going to want the windows washed or
anything while I'm up here.

SPACECRAFT No. We want you to get out and back before sunset

SPACECRAFT (Garble).

SPACECRAFT Well, while you're here we'll just read the
instructions ourselves Bruce.

SPACECRAFT Here you go. Okay, here we go. Hey, you know what
that was? It's chattering in plus or minus X. I don't know
what that's the attitude roll logic suppressing the thrusters
like that.

SPACECRAFT Houston, you catching all this?

COMMAD Roger Challenger, we're still here. No TV but
we're listening in. Question for Bruce, is the chatter between
the MMU and the MMU or is it in the MMU itself?

COMMAD Well it feels like the X thrusters are chattering
more if they're not staying on continuously.

SPACECRAFT Okay, copy that.

SPACECRAFT And Vance, got another problem down here with the-
reates (garble) FR, got tool boards can't seem to get them in.

COMMAD Okay, copy that.

SPACECRAFT Yes, you're cutting out again real bad but
understand you're having a problem with the tool board Bob.

SPACECRAFT That's affirm. They won't go into the slots.

SPACECRAFT Houston, copy that.

CAPCOM Roger, Vance. Just one query, has Bob rotated the
locks for the tool boards horizontal such that he can insert
them?

SPACECRAFT That's affirm, Jerry.
CAPCOM    Okay copy that, Bob. Can you give us any further elaboration on the problem?

SPACECRAFT   No further elaboration. Trying to insert the tool boards on the top slots. It won't go.

CAPCOM    Roger, we copy that Bob.

SPACECRAFT   You know this is really beautiful out here.

SPACECRAFT   One second.

SPACECRAFT   I'm getting a nice sun angle and everything. What do you got for an opening rate on me? About a quarter a foot per second?

SPACECRAFT   We'll have to wait a little while until we get a good angle on you there, Bruce. We're estimating somewhere around 3 tenths.

SPACECRAFT   Jerry, I got one of them in but I regulated back and forth.

CAPCOM    Okay, copy that, Bob.

CAPCOM    Challenger, Houston for Bob.

SPACECRAFT   Okay, you're maybe 5 feet from the C camera.

SPACECRAFT   Okay.

SPACECRAFT   Go ahead, Jerry.

CAPCOM    Bob, suggest you try inserting the bottom of the tool board first and see if that works any better.

SPACECRAFT   Well, it never has gone in that way but I'll try it. It goes in that way and come out. Okay, they're both in. The one that was difficult (garble) it in the machine a little bit. Looks like it's got the pipes scraped and a little bit of metal cut (garble) enough metal cut.

CAPCOM    Okay, copy that Bob. Might suggest swapping boards side for side and see if that works.

SPACECRAFT   They're both in now.

CAPCOM    Okay copy that. Sorry. And for Ron --

SPACECRAFT   Good show.
CAPCOM          -- on Al right we'd like S-band FM antenna to lower please.

END OF TAPE
CAPCOM - Bob. Might suggest swapping boards side for side and see if that works.

SPACECRAFT They're both in now.

CAPCOM Okay, copy that, sorry. And for Ron -

SPACECRAFT Good show.

CAPCOM - on Al right we'd like S-Band FM antenna to lower please.

SPACECRAFT (garble) that's a copy.

CAPCOM Roger.

SPACECRAFT Okay, we're seeing a (garble).

SPACECRAFT Okay.

SPACECRAFT .5 feet per second.

SPACECRAFT Okay. Oh, this is superb.

SPACECRAFT 175 feet.

SPACECRAFT I'm reading 150, so I agree with 175. Do you show about a 1/2 a feet per second opening?

SPACECRAFT Yes, it's jumping between about .3 and .8 so somewhere in the middle of that.

SPACECRAFT I got a real good look at the main engines now.

SPACECRAFT 204 feet.

SPACECRAFT (garble) And to think that this thing was sitting on the launch pad just a few days ago.

SPACECRAFT Yes, it's a marvelous machine.

SPACECRAFT You know, hey Vance?

SPACECRAFT Go ahead.

SPACECRAFT This is, the view you get out here is like the difference between the view you get flying in a heavy aircraft looking out the little windows and flying in a helicopter at mach 25, or (garble). It's really a beautiful panorama.

SPACECRAFT Yes, Bruce we have your view of the EMU camera, but I'm sure it must be great out there.
Okay, well it's aimed down a little bit, what are you seeing in the EMU camera?

It's a little distorted here but we can see the entire wing span, we can see the from nose to tail of the Orbiter. Maybe if you pitched down slightly we'd have it centered better.

Okay. Say when.

(garble) a little better. Maybe a little too much pitch. Hey, you got the Earth in. That's great.

I'm going to make another one of my scientific range measurements here. I will correct it and tell you what I think it is. Okay I'm, I guess it's about 250.

It's 260, that's pretty close for a device like that.

Well, I put a 25 foot windage on it. Here I got this EMU turned up full hot, but I'm actually getting a little bit chilly out here. And I'm taking pictures with great regularity.

Okay, we have you at out .3 feet per second.

(garble)

Good comfortable speed.

Rog, and Bruce could you go up and a little to your right.

Up and a little to my right, okay. I think that's about 275 now.

McCandless making his -

We have 283.

Thanks.

-- his long distance translation from the Orbiter.

(garble)

And 12 minutes from darkness.

Great, we're in good shape.

And up a little more, and to the right a little
SPACECRAFT: Okay, it just takes a little while to take affect. Okay about 275?

END OF TAPE
And 12 minutes from darkness.
Great, we're in good shape.
And up a little more and to the right a little more.
Okay. It just takes a little while to take affect. Okay about 275.
It's getting a little harder to spot you with this surveyors range finder, so we'll give you a reading in a minute.
Yes, I imagine the sun is getting into the field of view.
297.
Great. And a couple of more feet to make it an official 300. I'm on back in. Oh, this is great.
305, 306, might as well come back.
305, 306, that was an awful quick 10 feet, but --
McCandless at the full distance, a little over 300 feet from the Challenger.
Yes, that's about 306. Okay I'll come on back in.
Not getting the live television from the spacecraft now.
(garble) standard.
Using the --
We have you at 318 and still opening a little bit.
Well, I ought to be closing now.
Using the Ku-band antenna for radar tracking.
320 and still opening a little bit.
McCandless at 320 feet from the Orbiter.
How about about 3 tenths closing.
Standby one. Okay, 308 and closing at somewhere around .3 to .5.
SPACECRAFT  Is this the Africa coming up?

SPACECRAFT  Houston, Challenger. We haven't had any luck at all with Ku-radar in tracking them. We can get a couple hits and a little bit of signal strength once in awhile, but it's not staying on him.

CAPCOM  Okay, Challenger. We've been watching that on the ground also.

SPACECRAFT  And what's your attitude rating now, Bruce?

SPACECRAFT  Okay, system A is reading 1500, 1500. And system B is reading 1300, 1300.

SPACECRAFT  286 feet, closing at about .3.

SPACECRAFT  My figure is about 255 or 260.

SPACECRAFT  (garble) about 280 Bruce

SPACECRAFT  -- to the top of the payload bay. I'm measuring too.

SPACECRAFT  274, Bruce.

SPACECRAFT  Okay.

SPACECRAFT  268.

PAO  McCandless returning to the Challenger.

SPACECRAFT  (garble)

SPACECRAFT  Okay, you were both speaking at once.

SPACECRAFT  Yes, you have about 20 minutes till dark. We had another timebase being used so I guess you've got plenty of time to get back.

SPACECRAFT  Okay. It looks real good out here from sun angle and everything. Is this Africa I'm coming over?

SPACECRAFT  Sure is.

SPACECRAFT  Boy, it's beautiful down there.

SPACECRAFT  (garble)

SPACECRAFT  (garble) A little bit of eye Vance to see if they can't get it as I come in, a little better picture with a little
more of the Orbiter and the Earth. I'm not going to slow down my rate of coming in, I'm just going to ride it a little high.

SPACERRAFT    Okay, fine. Actually, your just about on timeline too.

SPACERRAFT    Want me to smile for the Ku-band, would that help? I've got a few filings in my teeth.

CAPCOM        Challenger, Houston, we're-

SPACERRAFT    Okay, you guys getting Bruce. Go ahead Houston.

CAPCOM        Roger, we're coming up 9-1/2 minutes to LOS TDRS.

END OF TAPE
CAPCOM   Challenger Houston, we're --
SPACECRAFT Okay you guys getting Bruce - Go ahead Houston.
CAPCOM   Roger, we're coming up 9 1/2 minutes till LOS TDRS. We'll listen to you over Yarrgadee. Next discussion will be at Guam, 01+30. And a reminder or request for Bruce, we would like to have him record the N2 tank pressures on the MMU before the recharge.
SPACECRAFT Roger, that. I'm reading them out very frequently anyway.
CAPCOM   Copy that Bruce.
SPACECRAFT And Bruce if you could go towards your feet, go down just a little bit.
SPACECRAFT (Garble) that.
SPACECRAFT You're starting to go into the sun.
PAO     McCandless has nearly completed his two long distance translations from the spacecraft.
SPACECRAFT (garble) EMU TV.
CAPCOM   We got some early, Ron. We aren't getting any now. We don't have any TV capability.
SPACECRAFT Okay, (garble) started on my monitor. I was wondering what you saw.
SPACECRAFT Hey Bob, we lost you. Where are you? I want to pick you up on one of my cameras. I keep track on you.
SPACECRAFT (garble) Another picture.
SPACECRAFT Hey Bob, when you have a chance, lean way back into the foot restraints, I can barely get a good shot of you. Oh, beautiful. Now smile or get something out from under your face.
PAO     Astronaut Stewart working with the manipulator foot restraint. Little earlier we heard him -
CAPCOM   Challenger, Houston. We'd like the radar back to GPC please.
SPACECRAFT Okay, we couldn't do any good with it in GPC or auto.
CAPCOM  Roger we copy that.

SPACECRAFT  Pitch up a little bit, get a little more of the nose there on your right maybe.

SPACECRAFT  How about left?

SPACECRAFT  Right. Okay, that looks good. Pitch a little more. Looks good.

PAO  Earlier we heard Stewart working with the tool boards, inserting those in the manipulator foot restraint, having some difficulty with them. Television we've been getting here for the last several minutes has been the replay of the earlier TV obtained over the state side pass.

SPACECRAFT  (garble) on the left, and a 1000 even on the right.

SPACECRAFT  Okay, got that Bruce.

SPACECRAFT  Now it's safe for me to go work on the TPAD is it not? Can't I just put the TPAD on over there Bob? Hey Bob?

SPACECRAFT  Yes.

SPACECRAFT  Can't I put the TPAD on over there?

SPACECRAFT  Here at the FSS.

SPACECRAFT  Yes, no at the SESA.

SPACECRAFT  Yes, sure you can put it on over there.

SPACECRAFT  Okay. Let me fly over and leave the (garble) gag with the FSS though.

SPACECRAFT  Okay.

SPACECRAFT  Do you have a wrist tether I can put it on? Just stay where you are, I'll come over to you.

END OF TAPE
SPACECRAFT -- with the FSS though.

SPACECRAFT (Garble).

SPACECRAFT Got a wrist tether that I can put it on? Just stay where you are. I'll come over to you.

SPACECRAFT (Garble) to go back over there and help you with that (garble).

SPACECRAFT Let me have a crack at it.

SPACECRAFT Okay.

SPACECRAFT Okay, Bruce, EMU TV off.

SPACECRAFT You want it on or off.

SPACECRAFT Off.

SPACECRAFT Okay, stand by please. I'll get it in a second. It should be off.

SPACECRAFT Okay.

SPACECRAFT You confirm, off.

PAO McCandless will be attempting shortly to --

SPACECRAFT Bruce, it looks off.

PAO -- to attach the T-pad, touncement pin attachment device. That is one of the major EVA tools used to help the astronaut in the MMU attach himself to a trunnion pin on a, for example, on a disabled satellite to become attached to that to be able to work on it. This is a test of the operation of that system.

SPACECRAFT Okay, I'm out of attitude roll.

SPACECRAFT Okay, we have you as going with the SESA and stall configuring the T-pad when you're able and drop the ranging gage and grab the handrail.

SPACECRAFT I am passed the ranging gage, Bob. I'm turning my CEA powers off so in case I bump the hand controllers they won't fire thrusters.

PAO This is Mission Control with 4 days, 1 hour, 11 minutes mission elapsed time. The Challenger has passed out of the range of the tracking data relay satellite on orbit #65. We'll have a brief pass over Yarragadee in about 9 minutes.
That's a UHF site and then we'll get Guam in about 18 minutes. Our next television opportunity is over Hawaii about 32 minutes from now. Currently, Astronaut Bruce McCandless has pretty well completed his final trip from the Orbiter's cargo bay out into space attached to the manned maneuvering unit and returned. His first travel opportunity there was 150 feet approximately away from the Orbiter and the second was to a distance of approximately 300 feet. He actually went out to about 320 feet before returning. Astronaut Bob Stewart preparing the manipulator foot restraint, the space age cherry picker type device which will be used on the end of the mechanical arm to provide a work platform for astronauts to work on space construction or to attend to satellites. Stewart was also --

END OF TAPE
STS-41-B AIR/GROUND TRANSCRIPT t215] 038:14:13 2/7/84 PAGE 1

PAO       -- will be used on the end of the mechanical arm, provide a work platform for astronauts to work on space construction or to attend to satellites. Stewart was also preparing the trunion pin attachment device to be attached to the front of Bruce McCandless's MMU. That is a clamping type, docking device that the astronaut will use to attach himself to the heavy metal pin that we call the trunion pin. It's just another way of docking with a satellite or other piece of space equipment. This is Mission Control at 4 days, 1 hour, 10 minutes Mission Elapsed Time, we're a little less than 2 minutes away from reacquiring voice communication thru the Yarragadee, Australia station. Flight Director Jon Cox, who is the Specialty Flight Director for EVA doing a status check with flight controllers here in mission control as to the health of the Orbiter systems. Everything is looking very good in support of the EVA. He spoke with the surgeon and crew members involved in the EVA, all doing well.

PAO       Mission Control, 4 days, 1 hour, 24 minutes Mission Elapsed Time, we've had a brief pass over the Yarragadee station with no voice communication. We'll be picking up over Guam in about 6 minutes. This is Mission Control.

PAO       Mission Control, we're standing by for acquisition through the Guam station.

SPACECRAFT How's it looking?

SPACECRAFT Good. Looking good.

SPACECRAFT Ok, we're (garble), Bob.

CAPCOM Challenger, Houston through Guam for 7-1/2.

SPACECRAFT Roger, Houston, Bruce is doffing the MMU and Bob is (garble) the MPR.

CAPCOM Roger, copy Vance, and to make sure we keep Bob on schedule for his MMU task, we want to make sure he is getting out of the MPR no later than 2+38.

SPACECRAFT Ok, Bob when you're ready, I'll go ahead and rotate so you can get in.

SPACECRAFT Stand by, Ron.

PAO       Astronaut Ron McNair preparing to maneuver the Remote Manipulator System so that Bob Stewart can get into the Manipulator Foot Restraint.

END OF TAPE
PAO    That's Ron McNair, preparing to maneuver the remote manipulator system, so that Bob Stewart can get into the manipulator foot restraint.

CAPCOM    Challenger, Houston, for Hooter. We would like the startrackers to track, and be advised we're sending you a new state vector.

SPACECRAFT    Okay, Jerry, copy.

SPACECRAFT    Okay, (garble) Jerry.

SPACECRAFT    Okay, Bob, coming up.

SPACECRAFT    How's she looking there, Bob.

SPACECRAFT    (Garble) keep coming.

SPACECRAFT    Okay, Ron, that will be good enough.

SPACECRAFT    Okay.

SPACECRAFT    I (garble) to change the (garble) 40% which is about 16 inches to a foot.

SPACECRAFT    Okay, try to (garble).

SPACECRAFT    Hold it right there.

SPACECRAFT    Okay, Bob, do I need to translate toward the nose, or do you have enough room to get in it there?

SPACECRAFT    I think there's enough room, I'm going to try.

SPACECRAFT    And all your tethers properly configured.

SPACECRAFT    Yeah.

SPACECRAFT    Bruce, where are you in your procedure row?

SPACECRAFT    I'm just finishing the MMU dump, turning off the main A and B powera, and I have read the pressure gages, I have 600 psi, in each side remaining. Starting in on GN2 service.

SPACECRAFT    Okay, we got that.

SPACECRAFT    Will you verify that the two nitrogen supply valves on RL3 are still open please.

SPACECRAFT    They're still open.
SPACECRAFT    Roger, thank you.

PAO          This is Mission Control, McCandless has parked his
             MMU, read the pressure gages and they will be preparing to
             recharge the nitrogen tanks.

SPACECRAFT  Okay, the problem is, okay (garble)

SPACECRAFT  Okay, (garble). I'll do a little at a time. How's
             that, Bob.

SPACECRAFT  More.

SPACECRAFT  Need more?

SPACECRAFT  Hold it right there.

CAPCOM      Challenger Houston, we're going LOS here, in 10
             seconds, Hawaii is next in 6 minutes. What we're following from
             Bob's activity we recommend that he terminate once he gets the
             MFR installed, configured, and press for the MMU.

SPACECRAFT  Okay, we copy, did you get that, Bob?

SPACECRAFT  I got it.

PAO          We're hearing astronaut Ron McNair-

SPACECRAFT  (garble)

PAO          Working with Bob Stewart-

END OF TAPE
We're hearing Astronaut Ron McNair --

Ok.

Working with Bob Stewart.

Ok, that's it, Bob.

Problem, Vance, is that with the tool board in
(garble)

Astronaut Ron McNair inside the Shuttle maneuvering
the mechanical arm while Astronaut Bob Stewart in the Manipulator
Foot Restraint will be moved to the area's force input locations, be
working there at those locations and they'll be evaluating how
stable and how firm a platform the RMS and MFR combination is.
Mission Control Houston, 4 days, 1 hour, 43 minutes, Mission
Elapsed Time. We're a little less than a minute away from
picking up again over the Hawaii station. Astronaut Bruce
McCandless in the cargo bay is busy recharging the port Manned
Maneuvering Unit with nitrogen and Astronaut Bob Stewart at the
Manipulator Foot Restraint mounted on the mechanical arm which is
being maneuvered by Astronaut Ron McNair who is up at the aft
flight deck.

Challenger, Houston with you through Hawaii for 7-1/2 and we're getting good TV.

Roger, Houston, right at the moment Bob is trying
to restart the MFR. Bruce is giving him a hand.

Roger, copy that, Vance.

Jerry, the problem is, trying to hold onto the
rabbit ears, and it's too slick.

Yes, just hold onto it until Bruce gets there to
help.

Yes, are you trying to restow it? Yes. Well, put
it in the RMS.

I'm trying to restow it.

Aren't we going to use it?

I've got to get the (garble) deployed.
SPACECRAFT    Here we go. Just a second. Stay back on you side there. Do you know what's happened also, it looks like it's broken, (garble) maybe. Ok, lets float her in.

CAPCOM      Challenger, Houston, I've got a couple notes for you, we'd like to get TV during initial portion of the TDRS.

SPACECRAFT  Could you say again, Jerry, we didn't copy that.

CAPCOM      Ok, Ron, when we come up on TDRS we would like to take the Ku control to command and on GNC SPEC 33, we'll need an ITEM 2 EXECUTE, verifying that there is no asterisk. That will allow us to have TV off of TDRS for a while early in the pass until such time that we have to drop it because of the pointing angles.

SPACECRAFT  Ok, she's locked in.

SPACECRAFT  Ok, Jerry, we copy that, that's when you come up on TDRS.

CAPCOM      That's affirm, as soon as we go LOS here you can do that, and also Hoot, one other suggestion, when you try radar during Bob's translations, suggest --

END OF TAPE
Okay Jerry we copy that, that's when you come up on TDRS?

That's affirm, as soon as we go LOS here, you can do that. And also Hoot, one other suggestion, when you try radar during Bob's translations, suggest using more auto track with manual search.

Okay, Jerry, auto track was the only one that I had any luck in at all. I was getting the signal returned in that one, but I was getting it any where else.

Roger, copy that, thank you.

And let me add, even in auto track, it never did establish a track on him.

Copy.

Okay we're locked back in the APC back here. The (garble) is deploy, what next? Okay, you want to recapture it, in the extension deploy.

Okay.

Stand by, Bruce, stand by, Bruce. Okay, Bruce and Bob we're ready to go ahead and recapture.

Yeah I'll get out of the way, and let Bruce, (garble) - best unit.

And we need yo get you back to the MMU.

Okay. Hey Bob, the configuration of the MMU, is you're hooked up to system 1, you're flowing gas, the crossfeed valves are open. You're in the middle of a propellant recharge.

Okay.

You need to terminate that, and then go fly.

Thank you (garble).

Enjoy it, have a ball.

(Garble)

Even got the big trash bag back here for me.

They've got the whole thing configured.
SPACECRAFT Yeah, what won't you think of next, you're all heart, Vance. Okay, have a nice flight, you need any tethers.

SPACECRAFT No but I'm going to leave the (garble) here with you. (Garble) in the trashbag.

SPACECRAFT Okay.

PAO Bob Stewart preparing to move over to his MMU, and lock into that.

SPACECRAFT And Bruce, you know the attitude that we're going to need that MSR in is going to be with the - parallel to the longeron with the handles at the aft.

SPACECRAFT Well, hang on a minute. (garble) get myself tethered here.

SPACECRAFT Bob, where's the force of evaluation device at?

SPACECRAFT It's out here.

SPACECRAFT And Bob, you'll terminate the recharge (garble)

SPACECRAFT (Garble) What are you saying Hoot?

SPACECRAFT Okay, when you get ready to hold that guy up there to put the grapple fixture in, of course, the MSR is going to want to be with the handles to the aft part of the spacecraft.

SPACECRAFT Why don't you rotate the end effector to 90 degrees -

SPACECRAFT Okay, yeah, yeah, Ron could do that. We put it back and start it (garble)

SPACECRAFT Say, Ron. Put it in the end effector mode, and come on down and (garble) at the (garble) there to your right.

SPACECRAFT 90 degrees. I'll put the end effector, you want it outboard.

SPACECRAFT I want to put it right down on top of the -

SPACECRAFT Okay, I'm going to roll the end effector outboard and come down. You hear?

SPACECRAFT (garble) yeah we're there. Come on down. Let me trim it up a little bit.

CAPCOM Challenger, Houston, we're 15 seconds LOS Hawaii TDRS in a couple of minutes, please configure for TDRS, and for
your information, camera delta is off, it was getting over heated.

SPACECRAFT Add a little more. Copy, Jerry. I understand camer delta off. (Garble) see if you can move it towards the forward longeron, (garble).

END OF TAPE
ST5-41-B AIR/GROUND TRANSCRIPT t219j 038:14:52 2/7/84 PAGE 1

SPACECRAFT  See if you can move it toward the forward longeron (garble).

SPACECRAFT  Going forward.

PAO  This is Mission Control. We've temporarily lost contact here, we'll pick up again in just about 30 seconds thru the Tracking Data Relay Satellite. We may get some television in the early part of the TRDS pass thru the use of the Ku-band antenna, until about 1/3 or 1/2 of the way thru the pass. We lose it due to pointing angles. We're at 4 days, 1 hour, 53 minutes into the flight. And we're running a little bit behind on the timeline.

SPACECRAFT  (Garble).

SPACECRAFT  And forward a little bit.

SPACECRAFT  (Garble) watch the main deflector cleared.

SPACECRAFT  I'm watching, I'm watching. Move it a little more. A little more. More. Come on down a little.

SPACECRAFT  Understand GN2 (garble)

SPACECRAFT  (garble)

SPACECRAFT  Ok, stop.

SPACECRAFT  Stopped.

SPACECRAFT  I'm going to release it, so you can go ahead and capture anytime you want but don't ridgidize.

SPACECRAFT  I'm going to go capture now.

SPACECRAFT  Capture.

SPACECRAFT  Ok, we're captured.

SPACECRAFT  Ok, take her up, that is ridgidize.

SPACECRAFT  Ok, ridgidizes.

SPACECRAFT  Ok, you're there, now don't do anything for a minute, just --

SPACECRAFT  A little more.

SPACECRAFT  Just play it cool for a minute, ok?

SPACECRAFT  Ok, will stand by.
STS-41-B  AIR/GROUND TRANSCRIPT  t219j  038:14:52  2/7/84  PAGE 2

SPACECRAFT  Ok Vance, GN2 supply (garble) valves closed.

SPACECRAFT  Ok, GN2 valves coming closed.

CAPCOM  Challenger, Houston, we're back with you thru TDRS and we're getting good TV again.

SPACECRAFT  Oh, look at the sunrise. Look at the sunrise.

SPACECRAFT  Ok, we copy, Jerry.

SPACELCRAFT  Ok, Bob, that takes you into MMU prep.

SPACECRAFT  Ok.

PAO  Astronaut Stewart completing the recharge and the disconnect of the MMU. We have a picture of Bruce McCandless working around the end effector of the mechanical arm.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Vance.

SPACECRAFT  Ok, need your advise on what Bruce should do with the MFR, would you like to have him do his normal timeline or pick up things that Bob would have done.

CAPCOM  Ok, Vance, we propose that he press on with his normal timeline of doing the MEB task. We'd also suggest if time permits to add a force evaluation using the device at the MEB station and that's on FS-11 and 12, box 19.

SPACECRAFT  Ok, copy that, did you get that, Bruce?

SPACECRAFT  Roger.

SPACECRAFT  That's on ML 86 B.

SPACECRAFT  Ok.

SPACECRAFT  Main A and B, MMU port, TDRS A and B two to open.

SPACECRAFT  Ok, that's in work.

SPACECRAFT  I think the umbilicals are already disconnected, Bob.

SPACECRAFT  Ok, (garble) ok Vance.

SPACECRAFT  Say again.

SPACECRAFT  That's ok, we've already got that.
SPACECRAFT    OK.

END OF TAPE
Okay,

That's on ML 86 B, main A and B, MMU port, TDRS A and B two to open.

Okay that's in work Bob. (garble) are already disconnected Bob.

Okay, (garble). Okay Vance.

Say again?

That's okay, we've already got that.

Okay.

Astronaut Bruce McCandless will be working with the main electronic box, that's the simulated box of electronics similar to that found on the solar maximum satellite. This will be another opportunity to practice actually making the repairs that would be made on the solar maximum satellite on the next shuttle flight. Orbiter approaching the western coast of the Baja peninsular.

(garble) on the alpha camera if that's okay with you.

Go ahead Jerry, you can have it.

Okay, thank you.

Bruce McCandless there working at the manipulator foot restraint.

Okay, Dr. McNair, gerronemo. Okay Bruce, we'll head over to the MEB. Okay. I'll get you over there, and take your command once we're there. Okay. You don't want to move this thing around a bit first? Bob -. Take it out and do a short checkout. Okay. Bob, if you look down at the earth you'll see Baja California. (garble)

McCandless on the end of the arm here.

Are you trying to get into the MMU? Yeah. Okay, your going to have to duck way down, and bring the EMU up behind the cue light extenders. A little more down, a little more down, there you go. You're in business. Now come up, - Ah shoot, you know what I didn't bring. (garble) handheld camera, it's sitting up there in - I'll go back and get it, let's do a few phase and checks here. Give me your commands, I'll go in payload and I'll just let me try and (garble) a littli bit. I'll take your commands. Okay. Let's go up. Right up. Beautiful. Up. Stop,

END OF TAPE
SPACECRAFT: Are you feeling those motions. Yeah they're very slow. Yawing right, you're in (garble) too. Really? Yeah, rolling to the right, rolling left. Okay, I guess we ought to head on over to the MEU at this time. I'll take you there. Just remember one thing. One false move, and then blap. Remember one thing, you're at the end of the arm. (garble)

CAPCOM: Challenger Houston, it sounds like it's Ron's turn to get even. And we have a note for you on cinerma 360 OPS.

SPACECRAFT: Go with that Jerry.

CAPCOM: Okay, cinema 360 OPS we would like to get Bob during his close in, initial checkout flying, and when you operate the cinema 360, we would like to get camera A views of the top opening, of the cover opening, as you operate the camera.

SPACECRAFT: Okay. Okay.

PAO: We see McCandless on the manipulator foot restraint.

SPACECRAFT: Beautiful, it really is. By the way, somebody ought to pass to Jerry Alden that his T-pad works great.

CAPCOM: Copy that Bruce, thank you.

SPACECRAFT: Okay, Bruce, I'd like to take it from there. I'm going to payload. Okay, let's go down a bunch. That's forward right. That's towards the end of the boat that has the tool on it. Going down.

PAO: McCandless will be moving over to the main electronics box.

SPACECRAFT: Okay, got it - monitor that end affector (garble) just assume that PAM sunshield. Up. Okay, we're stopped. Let me rearrange the furniture here a second.

CAPCOM: Challenger passing over the Yucatan peninsula.

SPACECRAFT: How's the flap going Bob. (garble) Problem, Vance, I don't know what's happening to me. Yeah. Have a (garble). You working on the lab boat. Stand by, Bruce. Bob. Yeah. Tell you what happened to me, they got the (garble) too far out, so when you pull a strip down over them, your really, I think they've got the (garble) too far in, so when you pull the strap down over it hard you're missing it. There's really too much slack, so what you've got to do, is feel for the (garble), with your fingers, and just sort of push them down over it. Okay. Did that help any. Yes. Okay, Bruce we're ready to put the arm -. I'm still rearranging the furniture here. Stand
by for your call. Okay, let's go forward. Okay, we're going forward. In my coordinates. Gotcha. Little more, little more. Little more, keep going, little more, little more, little more, keep going, keep going, little more. Okay now let's go down in my coordinates some. Going down. Little more. Wow one. How about right about an inch. Going right. Okay, that's good. And I haven't given you (garble) status check recently, Vance. Yeah, why don't you give us one now.

END OF TAPE
SPACECRAFT Yes, why don't you give us one here.

PAO We have a picture of Bob Stewart--

SPACECRAFT (garble) is 2+58.

PAO -- at his MMU and now we're back with a picture --

SPACECRAFT (garble) 4+20 with 60 percent power. And I've got 75 percent O2 left. I think that's all you're really interested in, isn't it.

SPACECRAFT Was that 50 or 60 percent power.

SPACECRAFT I think it was 60.

SPACECRAFT Copy.

SPACECRAFT Yes, 60.

SPACECRAFT Here comes (garble) 2 hours 58, (garble) 420, 5 percent O2.

PAO EVA crewmembers reading off the parameters on their EMUs. Remaining power and oxygen.

SPACECRAFT Bob, we copied the O2. Did you have power?

SPACECRAFT 59 percent power.

SPACECRAFT Ok, and thank you.

SPACECRAFT (Garble) It wobbles a little bit, but it's pretty useful as a work platform. You know what I'm doing, I'm sort of bouncing around intentionally. If your quiet about what you're doing, it stays there nicely.

PAO Now we see Bob Stewart preparing his Manned Maneuvering Unit for its flight, and there he goes with the release.

SPACECRAFT Ok, Bob, which step are you on now?

SPACECRAFT Ok Vance, I'm on 3.

SPACECRAFT Ok.

SPACECRAFT Ok, flight control is looking good. I'm going to come out with your permission.

SPACECRAFT Ok, you've got belt ok, huh?
SPACECRAFT Yes.

SPACECRAFT Good.

CAPCOM Challenger, Houston with a couple items.

SPACECRAFT Ok, Jerry.

SPACECRAFT Were is your safety tether?

CAPCOM Ok, we've seen that maybe Bob has his DCM cover not up. We suggest he do that if he has a chance. Also, Cinema 360 Ops. Your call on getting scenes, we'd like MFR coverage as well as MMU operations and if there's time, we're anticipating allowing Bob do some MFR ops after his MMU flying, over.

SPACECRAFT Ok, (garble). Bob, there you go, now the cable is strapped underneath the (garble) belt between the fitting on the MMU and the (garble). Your going to have to take the right hand lock belt loose in order to unstrap it. Well, if you like, I can (garble) you can't get that close in the MFR. Take the right hand lap belt loose let the reel go, and we'll retrieve it. Hang onto the lap belt, there's the lap belt under your arm, there you go, and between your wrist tether on your arm. There you go. Ok, now you can take your wrist --

END OF TAPE
SPACECRAFT: ...and between your wrist tether, your arm. There you go. Okay, now you can take your wrist tether and tie it off someplace, and the (garble) will be dropped. Interesting enough. I can feel the vibrations, from you hitting that hook with that tether reel. Okay. That's incredible, you know it. Okay, it looks like you're clear. I'll tell you why I take that right subway strip, put it around a mushroom, it got in my way, when I came back. Or you can worry about it later. Okay, looks good, Bob. (Garble).

PAO: Once Stewart checks out his --

SPACECRAFT: Get back to work.

PAO: -- checks out his MMU, he will do the same translations as McCandless has done. The 150 foot range and the 300 foot range from the Orbiter. McCandless still in the manipulator foot restraint. Stewart earlier unable to complete his activities at the manipulator foot restraint. The EVA team would like for him to be able to go back and get some of that if there is time. The crew has been running a little behind.

SPACECRAFT: (garble) jets (garble). Houston Challenger, this is the point where I would take the Ku power to standby and panel, do you want that done?

CAPCOM: That's affirmative Hooter, and also on spec 33, we would like an item 2 execute with an asterisk this time.

SPACECRAFT: Okay, Vance, I'm heading out. Okay.

PAO: Stewart moving away now from the Orbiter, they will use the Ku-band antenna for the tracking. So we will not be getting the television through that antenna.

CAPCOM: Challenger Houston, for Vance and Bob.

SPACECRAFT: Go ahead.

CAPCOM: Roger, Vance. Two things, if Bob experiences the same rattle that Bruce did, in X-translations, we would suggest that he attempt to do one without attitude holdon, see if that makes any different, and secondly because of timing here, I suggest that Bob translate to 150 feet, stop, readout the N2 pressures, if it's good, proceed to 300 feet, and then return, over.

SPACECRAFT: Okay, what's your N2 pressure now, Bob? (Garble). (garble) Jerry, (garble) hold off, no chatter.

CAPCOM: Copy, you don't get the chatter with attitude holdoff, Bob, thank you.

PAO   Stewart will do an abbreviated version of translations from the Orbiter, instead of 2 round trips, he'll stop at 150 feet, stabilize, and evaluate the MMU, and then proceed to 300 feet and then return to the Orbiter. This to help put the crew back on the time.

SPACECRAFT   (garble) 7 feet Bob. Okay. Be sure and smile some Bob.

END OF TAPE
PAO  -- stabilize and evaluate the MMU and then proceed to 300 feet and then return to the Orbiter, this to help put the crew back on the time.

SPACECRAFT  -- 7 feet, Bob.

SPACECRAFT  Okay.

SPACECRAFT  Be sure and smile some, Bob.

SPACECRAFT  (Garble).

SPACECRAFT  We don't have very good radar on you Bob. Its jumping around. I think it's somewhere around .3 to .5. You're out to 65 feet, 75 feet. And how much (garble) Houston? Are you experiencing that rattling in the +X, Bob?

SPACECRAFT  Yes.

SPACECRAFT  Say again?

SPACECRAFT  I guess I am. With attitude hold off, it does not do that.

SPACECRAFT  I think what it probably is, is the modulation of the +X thrusters (garble) to save propellant. One thing gets to be interesting in the invariant position you hold your legs. I find myself with my legs right straight up most of the time, and then I was pulling them in occasionally to see what that did. I'm here at the MEB, the 1 and 2 screw groups are loosened. It looks like the #2's had locked tight on them. The #1's did not and I'll tighten them back up again shortly.

SPACECRAFT  Okay, your 123 feet.

SPACECRAFT  Okay Vance, I've got good propellant.

SPACECRAFT  Okay, we'll take a check at 150.

SPACECRAFT  How about I take a break and turn around and have a look. How about that. Don't forget to take pictures! The button is hanging down on the cable, it's about 6 inches below and there you go. The velcro came off. Just flash off a couple. Looking good (garble).

SPACECRAFT  How's your prop Bob? Your GN2?

SPACECRAFT  Reading about 1950.

SPACECRAFT  Oh well, back to work.
SPACECRAFT: Okay, Bob. We have you 180 feet now, opening at .6. We didn't have data for awhile.

SPACECRAFT: I'm going to increase the opening rate.

SPACECRAFT: Let's go out to 300, then come back - if you wish.

SPACECRAFT: Sounds good.

SPACECRAFT: Yes, on this forward drill I keep finding that I'm inadvertently squeezing the trigger, the trigger force is too light.

SPACECRAFT: Hey, Bob. We have you at 1 foot per second on the radar. You better (garble) a few this way. 225 feet. Bob do you hear me?

SPACECRAFT: Yes, I got you Vance, slowing down.

SPACECRAFT: That's it 244 feet, .8, .65 now. Holding at .65, 255 feet.

PAO: Stewart about to reach the limit of his range.

SPACECRAFT: 253 feet at .6.

SPACECRAFT: I see what Bruce was saying about the view out here now that I've got time to look around.

SPACECRAFT: Very magnificent.

SPACECRAFT: (garble).

SPACECRAFT: That's where the Cinema 360 camera ought to be is out there.

SPACECRAFT: Take a couple of pictures.

SPACECRAFT: (garble).

SPACECRAFT: 288 feet.

END OF TAPE
SPACECRAFT (garble) That's where the cinema 360 camera ought to be is out there.

SPACECRAFT Take a couple of pictures.

SPACECRAFT (garble)

SPACECRAFT 288 feet, .55. And you might chrus up just a little bit too. We've got you going below the V bar. 303 feet, .65. Why don't you turn around and come on back.

SPACECRAFT Hey what's my velocity.

SPACECRAFT Opening at, standby. Okay we've got you closing now .75.

CAPCOM Challenger, Houston. We're wondering how Bruce is progressing?

SPACECRAFT Okay, Houston. I've got 5 out 6 free screws out. I've got, I'm working on the sixth one. I've got all 4 of the captive screws loose and it looks like column 2 had locked tight. I'll tighten them up in a minute. Comment, the velcro holding the (garble) is not very affective. The blanket is too (garble) and the velcro is too weak so I'm having to fight that but otherwise, things are going along beautifully.

CAPCOM Roger copy.

PAO McCandless reporting on his activities.

SPACECRAFT Bob, you're at 250 feet closing at .55. And Houston, we have the radar working good now.

CAPCOM Roger, Vance. Copy that, thank you.

SPACECRAFT Bob, what's your GN2 now?

SPACECRAFT (garble)

SPACECRAFT Okay, you're at 205 feet, closing at .8.

PAO We're getting a television replay of the earlier recorded downlink EVA activity. Astronaut Stewart on his way back in and the crew aboard the Challenger tracking him with radar.

SPACECRAFT We're looking good out there Bob. You're about 140, 150 feet now closing at .65.

SPACECRAFT Okay.
CAPCOM Challenger, Houston. We're showing a camera over temp on the ground.

SPACERRAFT Roger that Jerry, we'll check that out. 96 feet, .7 Bob.

SPACERRAFT (garble)

SPACERRAFT Okay the radar broke lock around 70 feet, so we'll just eyeball you from here I guess or you'll eyeball us it.

SPACERRAFT Okay.

SPACERRAFT Just like coming down in a helicopter huh.

SPACERRAFT (Garble).

SPACERRAFT A (garble) 24 helicopter.

SPACERRAFT (Garble) a little bit different.

SPACERRAFT Roger, recognize that.

PAO Crew's getting back on the timeline now. Condensing a couple of the activities there that over the last 45 minutes or so. McCandless will be completing his activities at the manipulator foot restraint while Stewart goes back to the special equipment stowage assembly and attempts to don the trunnion pin attachment device.

SPACERRAFT Okay Bob, what's your GN2 now?

SPACERRAFT 1500.

SPACERRAFT 1500.

END OF TAPE
CAPCOM      Challenger, Houston for Hoot.

SPACECRAFT  Okay, would you like to install a configure of TPAD and translate to the SPAS there Bob.

SPACECRAFT  (garble) doing that.

SPACECRAFT  Okay. And go ahead Houston.

CAPCOM      Roger, to stop the Ku-antenna from continuing (garble) we broke lock on Bob.s We'd like to take the Ku-band mode to manual slew. And also, Vance, our suggestions --

SPACECRAFT  (garble)

CAPCOM      -- our suggestions on continuing the timeline here are for Bruce to continue the MEB task and then perform the force evaluation and for Bob to do some handling qualities there in the cargo bay, and if he thinks he can, to go ahead and install the TPAD by himself.

SPACECRAFT  Okay. Fine.

SPACECRAFT  I'm heading for doing that Jerry.

SPACECRAFT  And thought you might want to consider making a couple of passes at the SESA while I rap up here. On the pin on top of the SESA.

SPACECRAFT  Yeah I got you.

CAPCOM      And Bruce and Bob, we concur with that idea. And for Ron, Ron you'll have to be in the SPAS detach mode to be able to operate the cameras on there.

SPACECRAFT  Okay, Jerry. Thank you.

CAPCOM      Challenger, Houston. We're about 3 1/2 minutes to LOS TDRS. Guam is next at 03 + 06. We'd like a status on your Cinema 360 operations, and for Ron, once you've completed commanding the camera on the SPAS, we'd like you to go back to the attach mode, please.

SPACECRAFT  Jerry, I'll get over there as soon as I can.

SPACECRAFT  (garble) the APC in my hand and ready for the moment to get some cinema 360 shots. The camera is set up, we have F11 set in there.

CAPCOM      Copy that Ron, thank you.
Okay, let's have another status check. You guys, have you lay your tools down.

Okay, one second please. The (garble) lighting is too bright to read it Vance.

I can't read it either.

Okay we can catch it later. Bob do you have one?

It's too bright Vance.

(garble) I think I'm going to go ahead and shoot a few feet of you working (garble) so you may want that dome (garble) on the cinema 360.

 Yeah, yeah.

The 360's (garble), we have bad lighting. Ah Jerry disregard that cinema 360 call. We've got the sun straight down in the bay and that's not going to work.

Okay, Ron, maybe we can get it at the next pass.

Thank you.

Jerry, Jerry.

Go ahead.

I have a (garble) a little bit about an EVA flight (garble) boots. I can get in the foot restraints. Unbelievably difficult to force them in.

Roger, Bob. Copy that. 50 seconds to LOS, was it width or height that was giving you the problem?

(garble) It might be tce width, toe height, or heel thickness.

Okay, copy, toe height, or heel thickness.

Bob, I wouldn't wear myself out on that foot restraint.

END OF TAPE
Bob, I wouldn't wear myself out on that foot restraint.

Mission Control Houston, 4 days, 2 hours, 45 minutes, Mission Elapsed Time, Challenger out of range of the Tracking Data Relay Satellite, we have about a 20 minute Loss of Signal period here before we pick up over the Guam station on orbit #67. Astronaut Bruce McCandless working at the Manipulator Foot Restraint was asked to continue and complete his activities with that while Stewart performs some of the additional checkouts of the MMU in the area of the cargo bay and then attempts to don the TPAD, the Trunion Pin Attachment Device and put that on the front of the MMU, preparations for his evaluation of that piece of equipment. He would then proceed with docking of the SPAS trunion pin. The crew has moved along well in getting back on the timeline and EVA activities are moving along about as planned at the present time. Mission Control Houston, standing by for acquisition through the Guam station.

(Garble)

Yes, that's what I mean, approach it from this side, I'll get you there.

Ok, press on while I close out this stuff.

Challenger, Houston with you through Guam for 7-1/2.

Ok, Houston, we read you. And Bruce, I'm going to take you on over.

Ok.

And Jerry, Bruce just finished the MEB task, Bob is standing by to dock right near the SESA, they suggest that they think Bruce could be repositioned to be working on the MASS SPEC while Bob's docking, so right now he's being moved on the RMS and we'll see if that's feasible.

Roger, that sounds fine with us, Vance.

And we've got, if it's okay with you, we can take Bruce back to the MIB for force measurements.

Stand by.

Ok, status check, Vance.

EMU status check, Vance.

Yes, I'm ready for it.
SPACECRAFT  IMU (garble) 3+57, time remaining 3+20, 46 percent power (garble), and 65 percent O2 remaining.

SPACECRAFT  Ok, thank you very much, and Bob at this point what do you have in GS2?

SPACECRAFT  1000 pounds.

SPACECRAFT  1000 lbs, thank you.

SPACECRAFT  Feel real symmetric, Vance.

CAPCOM  Challenger, Houston, we're showing a camera out over-temp on the ground, please check them.

SPACECRAFT  Ok, Bob, understand symmetric.

SPACECRAFT  Yes, we'll check the camera, Houston.

SPACECRAFT  We'll have lunch while we're headed to the MASS SPEC. (Garble) bars are good. Bob, you about to back into a safety tether stretched clear across the payload bay.

SPACECRAFT  Ok, I knew it was there.

SPACECRAFT  Ok Bruce, I'll take your commands.

SPACECRAFT  Ok I need to go left some more and forward a bunch.

SPACECRAFT  Going left, going forward. How's it look for room, Bob?

SPACECRAFT  Good. (Garble).

SPACECRAFT  Still left and forward.

SPACECRAFT  Ok.

SPACECRAFT  Hang on a minute, Ron, I'm going to reposition this --

END OF TAPE
How does it look for room, Bob.

Good. (garble)

(garble) and stow it.

Good.

Hang on a minute Ron. I'm going to repositioning this (garble).

Challenger, Houston with a query.

Go ahead.

Roger, Vance. We'd like to know if Bruce got any of the force measurement evaluations done.

Not yet, he's just know finished the MEB test.

Okay, copy that.

It's a really useful tool for working though. It seems to be nice and stable.

I'm glad to hear that. We'll pass it along to Bill Lofman, Bruce. And we don't want to spend too much time on the SPAS. We would like to at least get one set of force of evaluations done, probably over on the sill considering where Bob is operating with MMU right now.

Jerry, I'm fixing to take it back to the FSS.

Roger, Bob, copy. Understand that you are done with the TPAD work on the SPAS trunnion?

Okay, Ron. I need to go up in my coordinate system.

Okay, going up.

I'd like a little more, little more. Okay, now I need a little more up.

Going up.

Okay, now I need to pitch. Need to pitch down.

Pitching down.
ST3-41-B AIR/GROUND TRANSCRIPT t228j 038:16:09 2/7/84 PAGE 2

SPACECRAFT Keep coming. Coming. Keep coming down, pitch down. Coming pitch down. Okay, that's good. Let's see (garble) Bring me forward a little bit more.

SPACECRAFT Going forward.

SPACECRAFT Coming forward.

CAPCOM Challenger, Houston we're 30 seconds till LOS.

SPACECRAFT (garble) straighten it out.

CAPCOM Hawaii in 7.

SPACECRAFT Pitching forward.

SPACECRAFT You want to go forward.

SPACECRAFT Yes, forward still.

SPACECRAFT I'm going to need the A camera tilted up.

SPACECRAFT Okay, now up. Up, up in my coordinates.

SPACECRAFT Okay.

SPACECRAFT Okay stop.

SPACECRAFT Stop.

SPACECRAFT How about left a little bit.

SPACECRAFT Bob you need to tell us what (garble) stop.

SPACECRAFT Jerry, (garble) tilt it up. Houston, Challenger.

CAPCOM Go ahead Bruce.

SPACECRAFT Roger. I asked them to tilt the mass spec once for me.

CAPCOM Roger, you've got the procedures onboard there Bruce. We're going LOS.

SPACECRAFT (garble) camera, that's good.

PAO Mission Control Houston, 4 days, 3 hours, 14 minutes, mission elapsed time. We have loss of signal through Guam and we'll pick up again in about 5 1/2 minutes through the Hawaii station. Astronaut Bruce McCandless there at the manipulator foot restraint looking at the mass spectrometer, the instrument mounted on the shuttle pallet satellite. He has an
inflight maintenance procedure to fix that. He's going to be inserting a probe into the opening between the microswitch body. There is a microswitch that's thought to be not opening when it should, between the microswitch body and the switch cam lever and pry that up, trying to get that to function properly so that that experiment can be made to work again. Bob Stewart is still in his MMU. And we expect to have television when we acquire again over Hawaii in about 5 minutes. This is Mission -

END OF TAPE
PAO        Bob Stewart is still in his MMU and we expect to have television when we acquire again over Hawaii in about 5 minutes. This is Mission Control Houston.

PAO        Mission Control Houston, 4 days, 3 hours, 19 minutes mission elapsed time. We're about to pick up over the Hawaii station. The crew is a little over 4 hours into their scheduled EVA and will begin rapping it up fairly soon. The flight surgeon here in Mission Control indicates that both crewman doing well, holding up very well to this EVA. Crew is about back on the normal timeline. And a few final adjustments here should bring them back in line with it.

SPACECRAFT (garble)


SPACECRAFT Roger, Houston.

SPACECRAFT (garble) try it again.

SPACECRAFT Okay Bruce.

SPACECRAFT Say again Bob.

SPACECRAFT Looks like you got it Bob.

SPACECRAFT (garble)

PAO        Bob Stewart locking his MMU back into place.

CAPCOM    Challenger, Houston.

SPACECRAFT (garble)

CAPCOM    Challenger, Houston. If you've got a flight deck camera available, we'd like to use.

SPACECRAFT (garble)

CAPCOM    And also we have some notes for Vance.

SPACECRAFT Gee I entered it Bruce. You haven't seen it go yet, huh.

SPACECRAFT Nope.

SPACECRAFT Okay, let me try it again. Okay, entered it again.
CAPCOM Challenger, Houston. We're showing an over temp on camera alpha. Request you turn it off. And we've got some notes for Vance.

SPACECRAFT Bruce we may have it all confused, maybe what I should try is powering it off?

SPACECRAFT Okay, try powering it off, and then back on. It's done a little (garble) but not a lot.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead Challenger.

SPACECRAFT Yeah Jerry we wanted to check with you. The mass spec has refused to do program 5 oh, I think the last two times we've asked for it. Now we had previously had it do program 5 about 4 times. We're thinking maybe what we need to do is go power off, back on and try it again. Do you have any suggestions?

CAPCOM Roger, Hoot, we concur with that, and we'd like Bruce to press on, no matter what the results are here. We would like him to do one set of force evaluations, his choice as to location. And we see an over temp on camera alpha. Set it off please.

CAPCOM Challenger, Houston for Vance.

SPACECRAFT Go ahead.

CAPCOM Roger, Vance, we see approaching termination of the EVA. We would like Bob to proceed with the normal stowing of the TPAD and the MMU, preparing for closeout and entry into the airlock. We would like Bruce to do one set of force measurements off of the MFR and then for him to close out the MFR and prepare for closeout of the bay.

SPACECRAFT Okay. Like Bob to close out the MMU and stow the TPAD, Bruce to do one set of force measurements and stow the MFR, and close out the bay.

CAPCOM That's a good copy, Vance.

SPACECRAFT And Bob, how's the (garble) stowing. Hey Houston.

END OF TAPE
Okay. Bob, to close out the MMU and stow (garble) Bruce do one set of plus measurements and stow the MSR and close out the bay.

That's a good copy, Vance.

And, Bob, how's the doff going there?

Hey, Houston.

Go ahead, Bruce.

Okay, the mass spec is tilted forward. It looks like it went about 85 degrees or so and then stopped. It looks like it's written down (garble) to the point, where it's almost pointing dead forward, but it isn't yet in the little semicircle that it's supposed to stop in. Which may give them some data, or I can continue working on it.

Okay Bruce, copy the condition, we'd like you to proceed with the MFR force evaluations please.

Okay, see if you can command it back to the -Z direction Hoot. (garble) Okay, Houston, you got any suggestion for how to ask it to come back to -Z?

Stand by, Hoot.

Hey Ron. Go ahead, Bruce. Why don't you take me over to the MEV portion. Take me to one of these force evaluation locations. Your call. Okay, that's the same place we just left, I'll take you back over there. Okay, let's go. You all set there, Bruce. Yes, I'm clear. (garble) hanging off your left tether, or rather the back. It's clear, it's just a hook. Okay, here we go.

Challenger Houston, we would like a Ku control to command. GNC spec 33, item 2, execute, so we can have TV on TDRS please.

Okay, we'll do it.

See you at TDRS, going over the hill.

Mission Control Houston, 4 days, 3 hours, 27 minutes, mission elapsed time. A small gap in communications here, as the spacecraft passes between the range of the Hawaii station and tracking data relay satellite. On orbit number 67. We saw pictures there of astronaut Bob Stewart, after he had parked his MMU, the port MMU, and was disconnecting the trunion
pin attachment device from the front of his MMU. Bruce McCandless, still working in a manipulator foot restraint, was doing some repair work on the mass spectrometer experiment mounted on the shuttle pallet satellite. He has just concluded that activity and is proceeding to one of the force evaluations station where he will be applying force to various pieces of hardware, and then evaluating how stable the mechanical arm, the 50 foot Canadian built, mechanical arm is, as a work station, while force is being, is being applied to something that the crewmember is working on. We should be picking up momentarily through the tracking data relay satellite.

CAPCOM Challenger Houston, back with you through TDRS.

SPACECRAFT Roger.

CAPCOM And Vance, if the guys haven't already started there force of evaluation, we would prefer the force of evaluation be performed on the seal task point.

SPACECRAFT Okay, we were just about ready to close at the MED, but we'll continue on to the port longeron.

CAPCOM Okay, Rcn, thank you.

SPACECRAFT My cuff checklist just came apart. Did you catch it before it got away, Bruce? Yes, I caught it and stuffed it in the big trash bag. Remind me to bring that into the airlock? Okay we're going to bring it into --

END OF TAPE
SPACECRAFT    Ok, you're going to bring me up on the SESA to stow this stuff, aren't you Ron?

SPACECRAFT    We'll see what the time is and what the ground wants to do.

SPACECRAFT    Yes, that will actually speed things up.

SPACECRAFT    You think so, huh?

SPACECRAFT    Yes.

CAPCOM        Challenger, Houston, be advised we're going to be doing some commanding to the MASS SPEC, also we're wondering how the Cinema 360 work has been coming, and question, is there a flight deck camera that we could command and use?

SPACECRAFT    Yes, there is a flight deck camera, we don't have optimum lighting and we have no Cinema 360 as of yet.

CAPCOM        Ok Ron, thank you.

SPACECRAFT    Hey, Robert, they want the isolation valves on the MMU closed between EVAs.

SPACECRAFT    Ok.

SPACECRAFT    Have you got the umbilical locked up yet?

SPACECRAFT    No.

SPACECRAFT    Ok, good.

SPACECRAFT    Ok, we also need 2 launch bolts engaged.

SPACECRAFT    Pressure of that on, I'm trying to see what I'm hanging up on here.

CAPCOM        Challenger, Houston, we're showing another hot camera.

SPACECRAFT    And we're going to input the force on that thing.

SPACECRAFT    Roger, which one is that, which camera's hot?

CAPCOM        We don't know here on the ground, you'll have to look and see yourselves, guys.

SPACECRAFT    Ok.

SPACECRAFT    Hey, Bruce, I'll take your command, you can zero me on in.
SPACECRAFT   You told me where you're suppose to go.

SPACECRAFT   Bob, are you in to close out now?

SPACECRAFT   Yes Vance, I'm docked with the (garble) onboard, because I was a little bit low on gas. I've got to get rid of the TPAD here first.

SPACECRAFT   Ok.

SPACECRAFT   Ok Bruce, you're about there, maybe you can ask Bob for some guidance as to what and where.

SPACECRAFT   Take this one? This barble) reel here?

SPACECRAFT   Yes Bob, Bruce, I guess either one of those hand rails will do. Ok, Bob can see over there, he can help out.

SPACECRAFT   Am I suppose to be right over it, or what?

SPACECRAFT   Bob, can you see Bruce from where you are?

SPACECRAFT   No I can't Ron.

SPACECRAFT   Ok, yes get in, well you can make a forced, plot some force in the X, Y and Z directions, and we're starting off with the X direction.

SPACECRAFT   Why don't you move upward a little more, to my right.

SPACECRAFT   Going to your right.

SPACECRAFT   Stop

SPACECRAFT   Stop.

SPACECRAFT   Ok, and now I'm going to do a Y. How do you do a Y from here Bob?

SPACECRAFT   (Garble).

SPACECRAFT   Ok, I got you.

SPACECRAFT   And look at the side of your --

SPACECRAFT   Ok, here comes a tension that is a --

SPACECRAFT   Stand by, Bruce, we'll need to be ready to monitor your joint angles as you do that.

SPACECRAFT   Ok.
SPACECRAFT  What's going to be your first motion, Bruce?

SPACECRAFT  Friction, that is I'm going to pull the arm down into the +z direction.

SPACECRAFT  Ok, Bruce, we're going to look at the shoulder --

END OF TAPE
SPACECRAFT  -- to be ready to monitor your joint angles as you do that. Okay. Okay. What's going to be your first motion, Bruce? Friction, that is, I'm going to pull the arm down into the +Z direction. Okay, Bruce, we're going to look at the shoulder pitch joints and we're going to tell you if we see a point 2 degrees west. Point 2. Or you tell us if you feel the arm slip, okay. Okay. Okay, we have you in position hold, so go ahead put your force in. Expecting 23 lbs. We're expecting around 23 lbs. before it slips. 5 lbs., 10, 15, 20, 5 - You're kidding me, I'm running out of travel here. Oh, I know what it is. 25 - get any slip yet? Not yet. (Garble) in my coordinance, take me back and (garble) Hey, are you (garble). Does the 34 (garble). Okay, Bruce, why don't you release and lets do it again. Yeah, take me away for a minute. Okay have you released the force? Yeah. Which direction? Back a couple of inches. Back. In my coordinates. Stop. Okay, I'm ready to go again. Okay, Bruce, go ahead, we're watching. Okay. Okay, Bruce, there it is, there it is. Okay, that's about 35. All right, we need an X and a Y. Okay. Just one in each direction? (Garble) let's see what I can do here. (garble) coming up with it Bruce. X, I'm going to pull on it and try to drag it back toward the tail. Okay? Standby Bruce, till we give you a go. I'm standing by. Okay, we're going to do the same in position 0, go ahead. Okay, here we go. 10, 15, 20, 25, 30, 35, 40, 45, 50, okay, there she goes, there she goes. (garble), ah shit. Excuse me. He said, (garble). I said, Oh, it shifted. Do it again. That's what we thought you said. Okay, we got that, we have that measurement, that looks pretty good. What was it? What was your force again Bruce? I was calling it out, I show 55 now, but I think it was about 50 when it started slipping. Less than that because we're --. Is somebody recording this? Hey Bruce, there's some, we want to do that one again. Okay. (garble). Okay. Okay, go with it. Okay, very slowly. There's 20, 5, 30, 35, 30 - stop, that's it. Okay, Bruce, you must have, (garble). You want a Y direction don't you. Let's give them Y and then we'll have to go and do all three again with the brakes on. But give us a Y right now. Okay. And let me know when your ready. Okay. (garble) I think I'm ready. Okay. Okay, Bruce, we're ready, go with it. 10, 15, 20, there it goes Bruce.

END OF TAPE
SPACECRAFT  Ok Bruce, we're ready, go with it.
SPACECRAFT  10, 15, 20.
SPACECRAFT  There it goes Bruce.
SPACECRAFT  You see it?
SPACECRAFT  Right, we saw .2 degrees change.
SPACECRAFT  Ok, that was 20.
SPACECRAFT  Ok, now Bruce, let's go through them all with the brakes on. I'm going to put your brakes on (garble) --
SPACECRAFT  (garble)
SPACECRAFT  I'm slowing down in a +z direction.
SPACECRAFT  Ok, we're ready.
SPACECRAFT  Ok, down, 20, 25, 30 --
SPACECRAFT  (garble)
SPACECRAFT  I could feel that one. Ok, we'll do X next.
SPACECRAFT  Ok, Bruce, which one are you going to do next?
SPACECRAFT  X.
SPACECRAFT  Ok, we're ready.
SPACECRAFT  Ok, (garble), 10, 15, 20, 25, (garble) that's it.
SPACECRAFT  (garble)
SPACECRAFT  Ok.
SPACECRAFT  What was your reading when I gave you the go?
SPACECRAFT  30.
SPACECRAFT  Ok, we need a Y and we'll be finished.
SPACECRAFT  (garble)
SPACECRAFT  Vance?
SPACECRAFT  Yes, go ahead Bob.
(garble) both delta, (garble) port, TDRS A and D due to open.

Ok, we'll - standby.

Ok, here we go on Y, ready?

Ok, we're ready.

10, 15, 20, 25. I can feel it go at 25.

Ok, if you felt it that's good enough.

Yes, I felt it go scrunch, scrunch, scrunch.

Your (garble) Bob.

Do you want to try it again?

I got it at 25, well give it another try then.

Ok, Vance, we understand the circuit breakers are pulled.

That's right, they're pulled.

Ok.

Ok, here we go again with Y.

20, 25.

We can close them.

(garble) You got it?

You did say close them right?

Watch your (garble) next to the sunshield there. It looks a little close from here.

Oh, yes, ok.

Are we clear to close them?

No Vance, hold it open.

Ok.

Ok Bruce, if you're ready we'll get you out of there.
Did you get the Y? Ron, did you see the Y slope?
Sure did, we saw it and the force you got again
About 25.
25.
Got it.
Ok, we got that Bruce, and when you're ready, we'll get you out of there.
Ok, take me up to the SESA and let's unload this truck.
Ok, and we're going to roll the Cinema 360
Challenger crossing the coast of South America on orbit 67 right at the Equator. Bruce McCandless going through his force evaluations, inputs of force to various points that he's working on. Now we see the opening of the lid on the Cinema 360. McCandless and McNair are working together to determine at what point the force applied by the astronaut on the item he's working is imparted to the arm to the point to make the joints slip on the arm.
And Bob, we're standing by for your call to close the breakers, whenever.
Ok Vance, (garble).
And Challenger, Houston. Bob, while you're closing that out we'd like to get the pressures off of the --
PAO slip on the arm.

SPACECRAFT And Bob we're standing by for your call, to close the breakers, whenever. Okay, Vance, be a minute.

CAPCOM And Challenger Houston, Bob while your closing that out, we'd like to get the pressures off of the MMU.

SPACECRAFT Okay Jerry, on the B side, 800, excuse me 7-, the B side, was 600, A side 700.

CAPCOM Copy, Bob, thank you.

PAO Astronaut Bruce McCandless working at the manipulator foot restraint.

SPACECRAFT Okay, Vance, those circuit breakers you can close them again.

PAO And we're hearing from Bob Stewart working at his MMU. He's not in the picture at the present time. McCandless on his space-age cherry picker, riding it into the cargo bay and preparing to unload his tool caddies, and trash storage container into the special equipment storage assembly. Preparing for a conclusion to the EVA. McCandless and Stewart have been out for 4 hours, 39 minutes.

SPACECRAFT Those breakers closed Bob? Okay. I see two lights. (Garble) Ron. Standby, Bruce. Okay, Bruce, I had to get the camera up, so I could see you, we have you now. Okay. Okay, Bruce, we're proceeding. Roger that.

PAO This picture taken from one of the cameras on the 50 foot mechanical arm. McCandless approaching the special equipment stowage assembly.

SPACECRAFT (Garble) your commands, Bruce. Okay, take me over to the Orbiter starboard side a little, I'm (garble) around. Thanks, yeah, okay I'm in good I'm in a (garble) aren't I? Okay take me to the right a little. Okay going right. (Garble) Okay, let's stop there for a minute. Okay, stop.

PAO Bob Stewart moving across the forward bulkhead, by the handrains, to the other —

SPACECRAFT (Garble) heading for the —. Yeah sure, hang on.

PAO And the two crew members working around the special equipment stowage assembly. Loading back some of the tools that they have had out.
SPACECRAFT  Okay, first we get rid of the forced measurement device, (garble).

END OF TAPE
SPACECRAFT  Ok, first we get rid of the force measurement
device, like you said. Will you take me forward in my
coordinates somewhere?

SPACECRAFT  Ok Bruce, you're moving forward.

SPACECRAFT  We can come, yes need to come slightly toward the
box, that is starboard and a little bit forward and a little bit
up. That is to my right.

SPACECRAFT  Going to your right, we're working in (garble).

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead.

CAPCOM  Roger, Vance. We'd like to extend the period of
time we get Ku here. We would like to leave the Ku in command
until such time as you start taking Bruce back out of the bay to
stow the MFR. At that time he can go to standby.

SPACECRAFT  Ok, standby when we start lifting Bruce out of the
bay.

CAPCOM  That's affirm.

SPACECRAFT  Step, step over to your right Bruce.

SPACECRAFT  That's good, stop.

SPACECRAFT  Ok, we're stopped.

SPACECRAFT  Let's see, I guess we need to put the -- trash bag
back in the --

SPACECRAFT  Yes. Bruce, you look close to that GAS can. I'm
going to have to back you out of there. Standby, your motion is
taking us a little close.

SPACECRAFT  Wait a second, I'm just about ready to come out.
Oh shoot. (garble) Why don't you take me over and let me pick
up the TPAD and then bring it back over here and tether it and
then you can -- (garble).

SPACECRAFT  You want to go where Bruce?

SPACECRAFT  Take me out to the TPAD and let me bring it back
over here. See it floating out there in the middle? Left in my
coordinates.

SPACECRAFT  Standby Bruce.
SPACECRAFT We got to pilot him from the TV for a second.

SPACECRAFT Bruce, I can't take you there.

SPACECRAFT Ok, sorry about that then. Can you do me any good on television camera delta, or do I have to do that by hand? Well, let's go back and stow it. What the heck.

CAPCOM Challenger, Houston. We show the hot camera to be the flight deck 1. Request you turn it off please.

SPACECRAFT Hey, Vance.

SPACECRAFT Bruce, go ahead.

SPACECRAFT Let's head for the stowage location.

SPACECRAFT Ok, you ready to the MFR away?

SPACECRAFT Yes, that's it for the (garble).

SPACECRAFT Ok, I got you. Bruce, watch that your clear of the SESA door. I'm going to take you up aft.

SPACECRAFT Ok, I'm clear.

END OF TAPE
END DATE FILMED MAR 16 1984
SPACECRAFT Bob, what's your sublimator pressure now?

SPACECRAFT Hold on a second Vance.

SPACECRAFT What's this furry looking thing with EV2 written on it?

SPACECRAFT We just shut the water off Vance, the pressures coming up now.

SPACECRAFT And Bruce, (garble) over here, is a different from the others. It's a little sticky getting it up and down. The thing hitting the water tank too. Okay, Vance the sublimator pressure's 2.3 now.

SPACECRAFT Okay, it's coming up.

SPACECRAFT Very slowly, it's 2.4.

CAPCOM Challenger, Houston for Ron.

SPACECRAFT Go ahead Jerry.

CAPCOM Okay Ron, notes regard yur Cinema 360, 25 mm lens out the back, EV activities at night. For an ASA of 500, set your spot meter at 1-60th and redirect the F-stop to use.

SPACECRAFT Hey, guys, there goes a foot restraint into orbit.

SPACECRAFT Don't worry Jerry, copied that, that's exactly what I had in mind, thank you.

SPACECRAFT There it goes.

SPACECRAFT We'll we can go get it. Houston Challenger.

CAPCOM Go ahead Challenger.

SPACECRAFT Houston, Challenger. We lost our foot restraint, it's starting to float out, we can go get it if you wish, with the Orbiter.

SPACECRAFT Yeah why don't you.

CAPCOM Roger, we see it, how much gas does Bob have?

SPACECRAFT No the Orbiter.

CAPCOM Okay your call.

SPACECRAFT I'd let the Orbiter go get it.
CAPCOM  Standby.
SPACECRAFT  I'm going to go get it.
SPACECRAFT  Vance you want me to go get it or - -?
SPACECRAFT  No, no, no, no.
SPACECRAFT  - - or continue with the (garble).
SPACECRAFT  (garble) is off, he's going to do a rescue
   scenario.
SPACECRAFT  I think I'm going to hand on (garble) I guess you
can't get it.
SPACECRAFT  Got it? We've got load of RCFs onboard.
SPACECRAFT  Give me your hand, he's coming back in. Bob, give
   me your hand.
CAPCOM  Challenger Houston, for Bruce.
SPACECRAFT  Go ahead.
CAPCOM  Roger, Bruce, can you give us a status on that foot
   restraint down there on the SKSA, did it break off, or did it
   just come out, what happened?
SPACECRAFT  Looked like it pulled right out. I was going down
   to work on the secondary TPAD, and having completed the primary
   on the control box, and it just flew off.
CAPCOM  Roger, copy that, it's my recollection that we had
   a tether on that foot restraint.
SPACECRAFT  We took it off Jerry, to use it on EVA 1.
CAPCOM  Okay, understand.
SPACECRAFT  I'm at the end of my tether, Vance, your going to
   have to put in some -X.
Up at the end of my tether, Vance, you're going to have to furnish some minus X.

I'm not completely out of the MMU yet, but I can come get it.

No, just put in a little more -X, Vance.

Astronaut Bruce McCandless along the starboard slide wire moving back to pick up the free-floating foot restraint.

Beautiful job.

(Appplause)

At least, it won't be reentering in a few days.

I hope it'll be reentering in a few days. The rest of us are planning to.

Yes, they won't be reentering separately.

There you go.

Commander Vance Brand maneuvered the Orbiter.

Houston, Challenger.

Go ahead, Vance.

Okay, we thought it might get away from us and so we went and got it as you noticed and I guess the procedure works okay to go get it, to go after things that get lost which we happen to have in our procedures.

Roger that, Vance. We verified a procedure we didn't expect to use and you got some prox ops operations in that we missed earlier.

The big thing to remember in that procedure is when you change from the upper window to the aft window to be able to, to be sure and throw the sense switch at the same time.

Roger, copy that. There's always a "gotchya" in everything.

So we were a few seconds late in doing that but we got it anyway.

It looked super. You got a big round of applause
SPACECRAFT Demonstration anyway.

SPACECRAFT That's what we brought him along for.

SPACECRAFT I didn't need to worry so much about my gas did I?

SPACECRAFT I brought it back just for you, Bob, so you could do the hydrazine tool demonstration.

SPACECRAFT Aw, thank you.

SPACECRAFT I knew you wouldn't want to wrap up the day without that.

PAC Crew of the Challenger with a little demonstration in rescuing free-floating objects.

SPACECRAFT As far as I can tell, it's just a case of the (garble) down here having backed up. I'll tell you there's a lot of things up here that aren't locked (garble) or you know, in someway like that, secured, have a tendency after going through launch vibration, and being in 0g with all the little vibrations from the RCS thrusters firing, have a tendency to work loose. We found screws from 16 millimeter cameras and various little things floating all over the place inside the cabin.

PAO Astronaut Bob Stewart exiting from his MMU at the present time.

CAPCOM Challenger, Houston. Vance, you can go ahead and turn your flight controller power back off. Be advise you used 150 pounds of prop and the EVA folks say bravo Zulu.

SPACECRAFT Okay, good.

PAO Astronaut Hoot Gibson taking some 16 millimeter photography out the aft flight deck windows.

SPACECRAFT Well "We Deliver" may have been the STS-5 crew motto but we pick up also.

END OF TAPE
We deliver may have been the STS-5 crew motto, but we pick up also.

Vance, my (garble) numbers are 900 lbs system A, 700 pounds system B.

Okay, copy, thank you, Bob.

Okay, I have TPAD assembly is stowed. If you come by here, Bob, you might take a look, make sure it agrees with the way it was. (Garble)

Okay.

And I'll go over and get the SPAs wrench out of the PPSA and tighten these down if you'd like. The foot restraint.

Okay, I don't know if that's really necessary. What do you think?

I don't know, I'd hate to lose it again. Maybe this one will work.

Jerry, I'll catch that 25 millimeter cinema 360 in the next night pass. It got a little bit too bright on me, and I really ran the f stops up too high. As you can see we have about a thousand cameras around, and kind of tough getting around all of them, but we're getting them in.

Roger, it looks like you're doing a great job up there, Ron, I was going to say it looked like you had a camera shop going.

It's plenty busy.

Astronaut McCandless working at the special equipment stowage assembly box. And Stewart working with his starboard MMU.

Hey, Vance?

Yeah, go ahead.

On ML 86 B, Main A and B, MMU, starboard, heaters A and B two to open.

You're open.

Okay, those are all on the starboard, right?

Open now.
SPACECRAFT (Garble) Tether hooks are staying open out here, it must be the cold. (Garble) they're not latching.

SPACECRAFT Okay, Vance, on ML 86 B, no delta. Main A and B MMU starboard A and B circuit breakers closed.

SPACECRAFT Closed.

END OF TAPE
Okay, Bob, they're closed.

Bruce, is that foot restraint reattaching okay there.

Yes, yes. It's just that the, a hand wheel that held it in had backed out and when I put a little bit of a load on it, bingo.

(Garble) going down that slide wire to get it.

You just made it a little bit longer chain.

Well you see what happened is, I was on the port slide wire and my cable came across the RMS shoulder brace joint there and I wouldn't slide and it's only 35 feet long, so I ran out of, I ran out of wire before I did. But that was great. You gave a little bit of, gave us a little bit of minus X, it just lifted right up.

He walked back slowly to you.

Yes. Okay, Dr. Stewart, that is tightened about as tight as I dare without worrying about breaking the (garble) or something.

Okay.

Still not getting helmet TV?

Tried it again, Bruce, but no luck. Do you have it on now?

I just changed the switch again.

Give it another try.

Okay. If you wait till I get back over to CBSA I can get out the hammer and hit myself in the head with the hammer if you think that would help.

You could do it now. You don't have to wait.

(Laughter). You're all heart.

Hey Bruce, what are you looking at now? I am seeing something on that camera but I can't make any sense of it.

The SESA. And now I'm looking at the forward bulkhead, sort of.
PAO     McCandless working at the special equipment stowage assembly in which the hydrazine experiment is stored.

SPACECRAFT   Better make a note that the velcro on these butterfly strips is coming loose. It's not a very good security device the way it is now.

SPACECRAFT   Well the butterfly flap strips are supposed to be the security for the butterflies which are supposed to be the lock for the over center on the latch, so. Bob, are you referring to that configuration, the way it sticks out like that?

SPACECRAFT   (Garble) oh, it's film there isn't it.

SPACECRAFT   Yes that's, no, that's intentional.

SPACECRAFT   Okay, yes disregard.

SPACECRAFT   Yes, it is, to make it hard to pull loose. Flaps around like that, we might wrap the other one around like that and fit it on there. Okay, I'm going to head back on over to the port MMU and get ready to go try that, Vance. That's what the timeline says.

SPACECRAFT   Right, go ahead Bruce.

SPACECRAFT   Is that what the timeline.

SPACECRAFT   Okay, you need a wrist tether to take those --

SPACECRAFT   Oh, yes.

SPACECRAFT   Let me get them for you here.

END OF TAPE
Okay you need a wrench to tighten these.
Ah yeah.
Let me get them for you here.
Challenger, Houston, for Bruce and Bob.
Go ahead, Jerry.
Roger, Bob, we want the quick disconnects closed. Closed both of them, on both MMU's for closeout.
That is pushed on, but close to flow right?
That's correct, Bruce.
Okay, that's what I thought the configuration ought to be.
That's the way it is, isn't it?
Yeah. Bruce, give me the cue (garble) and we'll worry about that.
Bruce, there's quite a bit of static now, but the next thing on the timeline is go to MMU prep, port MMU, with the thruster cue light extension and camera from the starboard MMU.
Okay. (Garble) camera. Go around your back pack. (Garble)
What you doing, Bruce?
What?
What's happening?
Nothing.
Bruce, I tried it again, but I wasn't able to get anything up on your EMU TV. Bob's TV worked on that same frequency, but I can't get yours up.
I don't think the thing is working. I put the battery in last night, and I tried it, I got a green light. Not getting a green light today.
And it's time for status check.
Okay. (Garble)
How about you?
Yeah I'm working on it. Time EV 3+33. Time left, 3+55. 52% power (garble), 69% O2 remaining, and that's it isn't it?
That's it, please repeat the O2 remaining?
69%.
And Challenger, Houston, we'd like to be sublimater pressure, please, and temp valve setting.
Time EV's 3 34, Time left 3 50, 52% power, 69% O2. Sublimater pressure is 2.6.
2.6 and yeah what is your sublimater pressure Bruce? If you don't mind.
I'll get it for you in a minute, if you don't mind. Putting this SPA's umbilical tool back in the locker.
Challenger, Houston, for Bruce.
Say again.
Roger, Bruce, got a couple questions for you.
Go ahead.
First one is, did you reinstall the tether on the SESSA foot restraint, and secondly we're questioning the status of your EMU TV? It's one of the things we'd like to have for your engineering evaluation.
Negative, I did not reinstall the tether, on the foot restraint. I did take the SPA's wrench, however, and really really torqued all the bolts down though, it's on there tightly.
Okay, copy that, we would like you --
Ah Jerry.
-- to reinstall the adjustable wrist tether, prior to closing out the cargo bay. And what is the status of your TV?
Well do you want it adjustable wrist tether on the CDSA foot restraint, which is exactly the identical --
SPACECRAFT Well, do you want an adjustable wrist tether on the CBSA foot restraint which is exactly the identical thing and then latch with one?

CAPCOM Stand by.

SPACECRAFT And the status on the TV is that I have been cycling the switch, oh, every 15 or 20 minutes and we're getting nothing out of it. Can't even get a green light on.

CAPCOM All right, understand that Bruce, and the answer is yes. We would like wrist tethers on both portable foot restraints.

SPACECRAFT Okay. (Garble) Hey Bob.

SPACECRAFT Yes.

SPACECRAFT While you're there, why don't you see if there's anything you can do with this TV, pound on it once or twice or -- (garble).

LAUGHTER

PAO Astronaut Bob Stewart making some repair attempts to Bruce McCandless's EMU TV.

CAPCOM Bob, you could have used the hammer.

SPACECRAFT You guys look like 2 of the 3 stooges.

SPACECRAFT Psych yourself up for a one liner response there, Ron. Be careful.

SPACECRAFT I've never seen an Army Lieutenant Colonel beating on a Navy Captain's head.

SPACECRAFT Just haven't looked in the right places. I've seen it all the time. Got to keep them in line someway.

SPACECRAFT (garble) It's only because he was letting him do it.

CAPCOM Challenger, Houston, for Bruce. We're noticing a lot of squeal. Suggest you turn the volume controls on your DCM down slightly. That may help things and also be advised, we have turned off the mass spec.

SPACECRAFT Okay.

SPACECRAFT Okay copy, Jerry.
SPACECRAFT: Jerry, on that EMU TV, apparently we are configured properly. As I've said, I am getting SPAS TV through okay. Just can't pick up anything on the EMU TV, over.

CAPCOM: Okay copy that, Ron.

SPACECRAFT: And Bob, where are you now?

SPACECRAFT: I'm closing out this MMU.

SPACECRAFT: Okay.

PAO: Challenger crossing the coast of Southern Africa at the present time.

SPACECRAFT: Say again.

SPACECRAFT: Tell the guys at Martin I just put a scratch on there FSS. Might have to send it back to the paint shop. Sorry.

SPACECRAFT: How big a scratch.

SPACECRAFT: Well, it's on the inside arm here. It's a --

SPACECRAFT: Did it go all the way through the middle?

SPACECRAFT: Oh no, no. Just the paint.

SPACECRAFT: And we're starting to get behind on the timeline a little bit again. This time we'd have you into the engineering evaluation Bruce, and Bob into the hydrazine experiment.

SPACECRAFT: Okay, Vance. We'll be there very shortly.

END OF TAPE
Okay, Vance. We'll be there very shortly.

What am I wrapped around, around with my tether, Bob?

I got your tether running from your right side around your rear end, you'll have to turn a 360 to the right. Wait a minute, turn to the left. It's going the other way.

Turn to the left? It's coming off my left side.

Yeah, I couldn't see which side it was coming off of. Okay the wires hanging under the christmas tree fixture, Bruce, you have to pull the wire back towards you and do a 360 to the left.

Okay. Yeah, here we go.

Jerry, I think my RMS elbow camera's beginning to fade on me unless you're controlling from there, down there.

No, we're controlling from down here, Ron, but it's starting to look not too healthy either.

Hey, one of you, either one of you guys happen to wonder away from either, the longeron, let me know, I'd like to do another cinema 360 run before this pass is over. But only when you plan to do so.

Okay, the starboard MMU is in there locked and launch bolts are in place.

Okay, copy, Bob.

Do you want both of the nitrogen valves, nitrogen isolation valves, closed?

(Garble)

That is just like you had, taking them loose, now just push it back on. Do not rotate after pushing it on.

That's exactly where I left it.

Both of them?

We'll I'm turning the one that I didn't, the one that I used, the bay side, is stored that way, the other one you're going to have to open up the cover, and just turn it off.

Yeah that's what they want.
CAPCOM     Challenger, Houston.

SPACECRAFT     Yes.

CAPCOM     Roger, Vance, couple of notes, because of the camera failures we're experiencing, for the MMU engineering evaluation, Bruce will have to give us verbal marks on the MMU thruster firings that he sees, in place of the camera on his head. And also for Ron, we'll want to use cameras alpha and charlie for watching him do his test.

SPACECRAFT     Okay, Jerry, we copy all that. Roger, Bruce will have to replace the helmet mounted TV, by giving verbal marks.

CAPCOM     Roger, that, and we're becoming somewhat shaky on TDRS comm. 3 minutes till LOS, Guam next, at 01+34.

SPACECRAFT     Okay, copy.

END OF TAPE
CAPCOM: Roger that and we're becoming somewhat shakey on TDRS comm. 3 minutes till LOS. Guam next at 01 plus 34.

SPACECRAFT: Copy.

SPACECRAFT: Okay, reading out the GN2, I got 2,000 on the B side, 2,000 on each side. Down on ML86 B. If you would open the circuit breakers for the port MMU (garble).

SPACECRAFT: Okay, stand by.

CAPCOM: Challenger, Houston, for Bruce.

SPACECRAFT: Go ahead.

CAPCOM: Roger, Bruce. Because of the lower pressure on this recharge, if you need to half way through you are go for a second recharge to complete your engineering evaluation.

SPACECRAFT: I don't think we got the time for that. Although maybe I could do it (garble) Jerry.

CAPCOM: Okay, that's your call there, Bruce.

SPACECRAFT: Okay, Bruce, port circuit breaker is coming closed now.

SPACECRAFT: Open.

SPACECRAFT: They're open.

SPACECRAFT: No they're not.

SPACECRAFT: Okay, they're open.

SPACECRAFT: No, they're not. I can see the lights on then and the gage is still out here.

SPACECRAFT: According to Ron, the breakers are open. Let us recheck.

SPACECRAFT: Okay, Bruce, port MMU heater B is open.

SPACECRAFT: Yes, I need heater A and B on the port MMU, both of them. B is now open, A is still closed. Okay, you got it. Thank you, sir.

PAO: Mission Control Houston at 6 days, 1 hour, 14 minutes mission elapsed time. We've had a loss of signal through the tracking data relay satellite on orbit #97. As we went LOS there, Mission Specialist Bruce McCandless preparing to do his ingress donning on the MMU and going through his engineering
evaluation of the backpack. And Bob Stewart preparing to do his evaluation of the hydrazine transfer tool. We have about a 20 minute gap here before we pick up through the Guam station. This is Mission Control.

SPACECRAFT You're expecting to see a change, Bruce. How many degrees?

SPACECRAFT I (garble) 1 and 1/4 degrees.

CAPCOM Challenger, Houston, through Guam for 7 and 1/2.

SPACECRAFT Roger, Houston, loud and clear and we're in that first engineering evaluation test.

CAPCOM Copy that.

SPACECRAFT It's partially revised attitude --


SPACECRAFT Okay, we made it 1 degree, Bruce.

SPACECRAFT Okay. I'm just getting impatient. I thought we were going faster than we were but, yes, well, okay. 1 degree is interesting because it's 1 and 1/4 plus or minus a 1/4 is the spec.

SPACECRAFT Probably have a little bit of dispersion in our procedure too but --

SPACECRAFT That's okay, why don't we press on to step 2 and get some flying in.

END OF TAPE
SPACECRAFT  Probably have a little bit of dispersion in our procedure 2, but --

SPACECRAFT  That's okay. Why don't we press on to step 2 and get some get some flying in?

SPACECRAFT  Okay, we'll figure out of that up here, and go on to the next.

PAO       This is Mission Control, McCandless completing the automatic attitude hold verification checkout on the MMU. And about to move into the translational acceleration checkout.

CAPCOM     Go ahead, Vance.

SPACECRAFT  We are in dap D4 and B9, and A and B respectively, we're going into the translational acceleration test, what DAP would you like there?

CAPCOM     Stand by, Vance. A6 and Bravo 2, Vance.

SPACECRAFT  A6, Bravo 2. And I understand you want DAP A6 for the translational acceleration?

CAPCOM     Roger, Vance, we're rechecking that with some of the other folks. A6 and Bravo 2.

SPACECRAFT  Okay, Bruce, position MMU over port FSS, facing aft and no (garble).

SPACECRAFT  Ok, again on the starboard one, right? Is that affirmative you want to do (garble)?

SPACECRAFT  Hey Bruce, the answer's to use the C cameras, so the only way we're going to see you with the C camera on the starboard side. I have a shot of you right now.

SPACECRAFT  Okay.

SPACECRAFT  (garble) show you 50, about 56 feet, that sounds about right.

SPACECRAFT  Do you want me to face aft, is that correct?

SPACECRAFT  That's right, facing aft.

SPACECRAFT  Alright. This first one with the attitude hold on or off? Because it's on. (garble)

CAPCOM     Challenger Houston, we've got a change in your DAP config.
And Houston.

Roger, Vance, we would prefer B4, in the B DAP and use it.

4 in the B DAP, and A6 in the A.

Roger that, and operate off the Bravo.

You want to do this test in Bravo?

That's affirm.

Okay, I'm ready.

Standby.

Houston Challenger, just got a SM alert, and the supply water dump line tap is showing pegged at 132 high.

Copy that Challenger.

END OF TAPE
SPACECRAFT Houston, Challenger. Just got an SM alert and the supply water dump line temp is showing pegged at 132 high.

CAPCOM Copy that, Challenger.

SPACECRAFT Okay, Bruce, what's, as soon as the DAP's set up what this will amount to is successive translations between FSS and the forward PAM. You will mark when you make a THC command input and you'll mark when you release and make no corrections during the coast. The first one is going to be attitude hold on and it will be +X for 4 seconds.

SPACECRAFT Roger, I'm ready whenever you are. Ready? I'm ready whenever you are.

SPACECRAFT Don't hurry us. We're setting up the DAP.

SPACECRAFT Oh I'm sorry, I'm sorry.

CAPCOM Challenger, going LOS. 7 minutes to Hawaii.

PAO This is Mission Control Houston at 6 days, 1 hour, 43 minutes mission elapsed time. We have a gap in communications with the Challenger. Just passed the Guam station and we'll be reacquiring over Hawaii in about 5 minutes. The crew is 4 hours and 20 minutes into this second spacewalk of this shuttle flight. The earlier planned activities, docking with the rotating SPAS on the mechanical arm were deleted due to some difficulties in some of the motions of the mechanical arm. The crew has done some TPAD operations, trunnion pin attached device operations with the SPAS earlier. Astronaut Bob Stewart did some evaluation of his MMU. At one point we had one of the attachable foot restraints come loose. It was not tethered and began to float away from the Orbiter and Commander Vance Brand maneuvered the Orbiter to match the drift rate of this piece of hardware and Astronaut Bruce McCandless moving down the starboard slide wire toward the rear of the Orbiter was able to retrieve that as the Orbiter moved into, in close to the drifting piece of equipment. That was recovered and installed on the special equipment stowage assembly. McCandless is now in his engineering evaluation of the MMU, has been working on the automatic attitude hold evaluation. The Orbiter is used as a stable platform from which to get some photography of the MMU and its attitude hold test to determine how stable it is in the automatic attitude hold. And McCandless, following that, will move on to the translational acceleration test and then the rotational acceleration test of the MMU. Astronaut Bob Stewart will be doing the hydrazine transfer test. There is a special piece of equipment onboard the Orbiter this time which will, which is a representation of a hydrazine transfer tool to be used in the future to service satellites. Hydrazine is a fuel used by many satellites for their attitude control while they are in orbit.
It is one of the life limiting factors of many satellites and this will be a servicing test confirming the ability to actually transfer that fluid in orbit so that future satellites may have their hydrazine tanks refilled. This particular test will involve --

END OF TAPE
PAO many satellites for their attitude control while they are in orbit. It is one of the life limiting factors of many satellites, and this will be a servicing test confirming the ability to actually transfer that fluid in orbit so that future satellites may have their hydrazine tanks refilled. This particular test will involve transfer of freon rather than hydrazine on the first test. Hydrazine is a very dangerous fluid to handle, so this test will be using freon with a dye in it so that any leaks might be observed. We'll be picking up in about a minute and a half over the Hawaii station. At 6 days, 1 hour, 47 minutes, this is Mission Control Houston.

SPACECRAFT Okay, you need to feed out just a little further Bruce so the helmet mounted TV can see the back of your head.
SPACECRAFT Okay.

SPACECRAFT Rather the lazer can see the back of your head.
SPACECRAFT Yes, I got the idea.

CAPCOM Challenger, Houston. Hawaii for 7 minutes. We've got a couple breakers we'd like to check.

SPACECRAFT Okay, go ahead.

CAPCOM Roger, Vance. ML86 bravo, row A, we would like to check circuit breakers main alpha and bravo H20 line heaters. We think they should be closed.

SPACECRAFT Okay, Hoot's going down to check those, and as soon as he reports back, Bob has something to talk over with you.

CAPCOM Okay.

SPACECRAFT Say Jerry, your main A and main B water lines heater A and B are both closed.

CAPCOM Okay, Hoot, thank you, and standing by for Bob.

SPACECRAFT Okay, the hydrazine transfer stuff is going very smoothly up until installing the (garble) tool. At this time, I cannot get the quick disconnect seated. I've gotten out of the foot restraints, put as much force on it as I can, and there's something there that just won't let that little quick disconnect push into the slot.

CAPCOM Okay, we copy that Bob. We got a set of tools here. We'll start looking at it right away.

SPACECRAFT Okay. Bruce as soon as Hoot gets back upstairs, we're ready for the test with sill attitude hold.
Okay.

That will be again, +X 4 seconds.

(garble).

Okay Bruce, let it rip.

Okay, (garble) 2, excuse me. Your attitude hold is off, here we go. 1, 2, 3, 4, - I put some minor +Y in.

Ron is keeping the range finder on you.

Okay.
SPACECRAFT  Ron is keeping the range finder on you.

SPACECRAFT  Okay.

SPACECRAFT  Okay, Bruce, we probably need a repeat on that because we got off your head too fast and we had rotation effects added in.

SPACECRAFT  Okay.

CAPCOM  Challenger, Houston. Be advised we have commanded the Ku to on for TV coming up TDRS and also be advised that you are on transmitter 1, preamp 1. No actions required.

SPACECRAFT  And Jerry, just for a status report on hydrazine, the only task remaining, everything is seated. I just have to twist the freon valve open but the quick disconnect on the other end of the line will not stay seated.

CAPCOM  Okay, Bob, we copy all that. We're looking at it here on the ground. We don't know what else to recommend right now, Bob. We'll think about it and talk to you further and also, be advised, Vance, as soon as you can we'd like you back into auto so we can get good comm through the Ku.

SPACECRAFT  Okay, well after the tests we're doing right now we will still have 2 yaw maneuvers but before we do those we could go into auto and get back into the attitude.

CAPCOM  Okay, that sounds like a good idea to us. We're 1 minutes till LOS Hawaii.

SPACECRAFT  Okay.

SPACECRAFT  Okay, I'm ready.

SPACECRAFT  Okay, let here rip.

SPACECRAFT  Okay. (Garble)

SPACECRAFT  Okay, your feet are in the way now Bruce so might as well stop that.

SPACECRAFT  Okay, let me just drift on down to here.

SPACECRAFT  He's down into the - start a maneuver.

SPACECRAFT  (Garble) There's a bright light.

CAPCOM  Challenger, Houston, through TDRS.
SPACECRAFT    Okay, Jerry. Bruce is coming down into the bay now. We'll start the maneuver shortly.
CAPCOM        Okay, Vance.

END OF TAPE
CAPCOM: Okay, Vance.

SPACECRAFT: Okay (garble) A and M.

CAPCOM: Challenger, Houston for Bob.

SPACECRAFT: Go ahead Jerry.

CAPCOM: Bob, question on your problem there with the QD. Is the mechanism on the end of the line, does it slide freely.

SPACECRAFT: Yes.

CAPCOM: Okay, we'll go back --, we'll go back and scratch our heads again.

SPACECRAFT: Whatever is supposed to retain that thing down at the end of the, at the end of the female part of the foot disconnect is closed, Jerry. That's what it appears to me.

SPACECRAFT: Okay, Bruce we're in attitude and start the next one.

CAPCOM: Copy you think it's frozen.

SPACECRAFT: Okay.

SPACECRAFT: Yes.

SPACECRAFT: (garble) crossfeed I'm down to about 800 on A and 1800 on B.

SPACECRAFT: Understand 800 and 1800.

SPACECRAFT: Roger. We've been running on the A side only all this time.

SPACECRAFT: Roger.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead Vance.

SPACECRAFT: Okay, we've completed 1/2 of the translational acceleration phase. Bruce has 800 lbs on the left side, 1800, 1800 in the right. Just advise you, I guess you want him to switch sides don't you?

CAPCOM: Standby.
CAPCOM  Okay, that sounds good Bruce. Just go ahead and let them balance out. And a reminder that we want to be set up at half past the hour MET here.

SPACECRAFT  Roger. And that's about a little less than 30 minutes from now.

SPACECRAFT  Next one is a Y translation?

SPACECRAFT  Yes, it will be 4 seconds + or - and (garble) it'll be to send you forward and attitude hold off.

SPACECRAFT  (garble).

SPACECRAFT  Attitude hold off.

SPACECRAFT  (garble) I'm ready when you all are.

SPACECRAFT  Okay. Squeal's pretty bad in your com.

SPACECRAFT  Okay, I was trying to say I was ready when you were. Okay to go ahead?

PAO  Astronaut Bob Stewart attempting to -

SPACECRAFT  Ron is it okay, to go ahead?

PAO  Stewart attempting to troubleshoot a quick disconnect problem on the hydrazine transfer.

SPACECRAFT  1, 2, 3, 4 -

CAPCOM  Challenger, Houston for Bob.

SPACECRAFT  Go Jerry.

CAPCOM  Okay, Bob. Will the outer mechanism on the female side slide?

SPACECRAFT  Yes.

CAPCOM  Okay copy, yes.

SPACECRAFT  I tried heating on that too. Yes, that will slide. I tried all the sliding mechanism. That I could get my hands on.

CAPCOM  Okay, copy.

END OF TAPE
CAPCOM -- on the female side slide.

SPACECRAFT Yes.

CAPCOM Okay copy, yes.

SPACECRAFT I tried beating on that too. Yes, that will slide. I tried all the sliding mechanisms that I could get my hands on.

CAPCOM Okay copy that, Bob, and did you say you tried beating on the female side also?

SPACECRAFT Yes I did.

CAPCOM Okay.

SPACECRAFT Okay, Bruce, that ought to be enough and set up for 1 more going in the opposite direction in Y.

SPACECRAFT Okay. I think it's Z but we'll --

SPACECRAFT Sure enough. I guess you wrote it. It's Z.

SPACECRAFT Actually, Lou Ramone wrote it but I went over it a lot with him.

SPACECRAFT You don't believe that though. You're going to owe us a lot of beers.

SPACECRAFT Owe you a lot of beers for what.

SPACECRAFT You better stop, Bruce.

SPACECRAFT Right at our back window.

PAO Bruce McCandless doing his engineering evaluation of the MMU and Bob Stewart --

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Bob.

SPACECRAFT Jerry, this line will retain the pressure itself won't it? Isn't that quick disconnect just delete it to the pressure gage?

CAPCOM Stand by. Ron, Bob.

SPACECRAFT (Garble) If I open the valve, the line should stay pressurized itself I just won't be able to read it. I could check it when I get to Houston, get it back to Houston.
Houston, Challenger. We just got a SPAS DHS SM alert in addition to about 6 others.

Okay, copy that. You can disregard the SPAS message.

Okay.

And Challenger, Hoot, we think that that's a dropout in the RF link probably when the MMU crewmen are getting between you and the SPAS.

Okay, sounds good. Thanks.

Okay, I'm ready, Ron.

Okay, we're ready whenever you give us a go.

Okay, here we go. 1, 2, 3, 4.

Stand by. Tape just ran out. We're going to have to do a restart.

Houston, Challenger.

Go ahead, Challenger.

Jerry, are you receiving our TV?

Yes sir, we are. We're getting a great picture of Bruce there along the sill.

Okay, good. As you know Ron is controlling the C camera and we expect you're controlling all the others.

Okay, copy that.

Bruce, what is your GN2 pressure now?

Okay, 800 on the left and 1100 on the right.

Okay, and let's have a status check.

I can't see it with the sun in my eyes like this right now but I'll give it to you down at the other end.

Okay Bob, how about you?

Time EV 4 hours 45 minutes. Time left 2 40, 36% power. 55% O2. Sublimator pressure 2.7.

END OF TAPE
SPACECRAFT: -- 55% O2, sublimater pressure 2.7.

SPACECRAFT: Copy. And Bruce, if we could, we'd like to conserve your fuel, so that you've got some left, about 20 minutes from now.

SPACECRAFT: Understand. (Garble) this will be the last one of these 4 second blast, and I think they only got some rotations up here, which are fairly subtle. The EMU jets check and things like that. Or we could do a flying recharge.

SPACECRAFT: Anybody else up here, that could come up and give you a recharge, huh.

SPACECRAFT: No, I mean I could fly over near Bob, and he could hook a hose on, and fill me up without even getting in the FSS. Another first - space-to-space refueling.

SPACECRAFT: If he's agreeable.

SPACECRAFT: You're with me, all I've got to do is twist one valve here, as soon as they tell me to.

CAPCOM: Challenger, Houston, for Bob.

SPACECRAFT: Go ahead, Jerry.

CAPCOM: Okay, Bob, we had a short drop there. We have no further ideas on how to troubleshoot your problem there. We think that the QD will hold the Freon, you are going to open the valve.

SPACECRAFT: Okay, going to do that.

PAO: Bob Stewart proceeding with the hydrazine transfer test tool. This particular test -

SPACECRAFT: (Garble) test, decent test apparatus that's the problem. Nothing to do with the refueling tools. I'm opening the valve, quick disconnect is holding.

CAPCOM: Roger, copy that, and we concur with your evaluations, sounds like it all went very smoothly.

SPACECRAFT: It went smoother than it ever has on the ground, Jerry, for reasons that I will de brief on the tape tonight.

SPACECRAFT: Bruce, we have to go into auto. I think our rate is so small, that it will be all right when you (garble) position.

SPACECRAFT: Okay.
CAPCOM Challenger, Houston, we got a note or two for you.

SPACECRAFT Okay, go ahead, Houston.

CAPCOM Okay, down on the middeck on M032N, you are go to open up the LEH O2 valve, number 5 again, start flowing O2.

SPACECRAFT Okay, Jerry, copy that, we'll open the O2 (garble).

CAPCOM Okay, and within the next 5 or 10 minutes or so, we'd like to get camera D, tilted down another 10 degrees.

SPACECRAFT Okay, Jerry, Ron says he's got that tilted down into the bay now.

CAPCOM Okay, that was camera delta.

SPACECRAFT Jerry, I get delta.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Vance.

SPACECRAFT Roger, on camera delta, would you like to do that yourself, to point it into the center of the bay, or would you prefer Ron to.

CAPCOM Well I guess we want to know, where you plan on having Bruce. That's who we're going to be point at. And we cannot drive it --

END OF TAPE
-- we'll come at watch you playing with the Oilers.

I'll be the little guy they carry off on the stretcher after every kick off.

Houston, how do you like that Earth, view of the Earth there?

Roger Vance, that's absolutely beautiful. It gives you a good break, to sit and look around for a little while.

Okay.

Jerry that one may not be as picturesque, but composition wise, how is it?

Composition is fine Ron, it's a little bit dark right now. And we got a good shot of you there in the flight deck.

Bruce, we can't hardly see you down there, why don't you come up just a little bit.

Ok.

I got plenty of shade up here Bruce.

You what?

Still in plenty of shade, if your warm.

No, I'm freezing, (garble)

Houston if you'd like we'll give you control back on the cameras for a while.

Okay, Vance.

Okay, Jerry that a little better on delta?

Yeah that looks pretty good.

Just like that.

Challenger Houston, the President of the United States.

Commander Brand, I'd like to say a -

Yes -
REAGAN -- good morning to you and your crew. I'm talking to you from California, I don't know exactly where you are, I know your up there someplace, but you're all doing a fine job on this historic mission, and I'd like to say hello to Bruce McCandless and Bob Stewart, for sending us this spectacular television coverage of man's historic walk in space. Let me ask you, what's it like to work out there, unattached to the Shuttle, and maneuvering freely in space?

SPACECRAFT We'll we've had a great deal of training, sir, so it feels quite comfortable. The view is simply spectacular in panoramic and we believe every units first time working unattached we're literally opening a new frontier in what man can do in space, and we'll be paving the way for many important operations on the coming space stations, sir.

REAGAN Well that is just great. You've really opened a new era for the world in space with this mission. You've shown both our commercial partners and our foreign partners, who play an important role in this and other missions to come, that man does have the tools to work effectively in space. You, I understand, you had an opportunity this morning, an unexpected or unscheduled thing, maneuvering the Shuttle and making a recovery of an object in space. Commander?

SPACECRAFT Yes sir.

REAGAN What do you and Hoot Gibson and Ron McNair do while Bruce and Bob are working outside?

SPACECRAFT Well, we're pretty busy in here, just keeping track of them. They have a lot of tests to go through, of course it is the first check out of something that's rather futuristic, the backpack, the Man Maneuvering Unit, so we're just monitoring them making sure that we don't lose sight of them.

REAGAN That's good. Say Hoot, I understand you must have a special interest in making sure everything's working right up there, since your wife will be making the trip onboard the Shuttle this summer. Do you have any tips to pass along to her?

SPACECRAFT That's true, Mr. President, she is, she is going up about in August, and that's why like you say, I'm trying to check everything out and make sure it's going to work we'll when she goes. The thought of myself going up doesn't bother me, but I think I will be nervous when she goes.

REAGAN I can understand that. Do you think she will enjoy it?

END OF TAPE
Roger, on camera delta would you like to do that yourself to point it into the center of the bay or would you prefer Ron to.

Well, I guess we want to know where you plan on having Bruce. That's who we're going to be pointing at and we cannot drive it. It's not tiltable.

Bruce, would you tilt the camera such, camera delta such that it's pointing more or less at the trunnion pins.

Okay, in work.

As in elevation.

McCandless hovering above the payload bay in his MMU while Stewart works at the special equipment stowage assembly with hydrazine transfer test.

Okay, you all are panning it I can see.

Yes, Bruce, I think the elevation is good already. I'm just panning it around to point at the SPAS TPAD.

And Bob, in a few minutes where would be a good place for you over in the center of the bay?

It would be hard for me to get to the center of the bay, Vance.

Okay, why don't we put, have you go down the starboard slide wire and get over in that area about where the SPAS comes over to the starboard slide wire.

Okay, I'll go down the port slide wire and translate across.

Challenger, Houston.

You're on the starboard slide wire now.

Am I? Oh yes, I'm up across the bay aren't I.

Okay.

Hey, Bob, give me a long count.

Challenger, Houston.

1 2 3 4 5 6 7 8 9 10 9 8 7 6 5 4 3 2 1, out.

Little longer.
SPACECRAFT  1 2 3 4 5 6 7
SPACECRAFT  Okay. Vance, give me a long count.
SPACECRAFT  1 2 3 4 5 6 7 8 9 10 5 9 8 7 6 5 4 3 2 1.
SPACECRAFT  Okay, does that fix the squealing? Seems to
doesn't it.
CAPCOM      Challenger, Houston.
SPACECRAFT  Yes, it seems to.
SPACECRAFT  Go ahead, Houston.
CAPCOM      Roger, Vance, before Bob leaves the SESA there
we'd like to get a camera A view of him with the ORS activity and
also, can you give us a status of where the 2 guys are with
respect to their task?
SPACECRAFT  Bob is nearly finished with the hydrazine but he
came up with that hang up in the QD. Bruce is in the, taking the
Z translation last step of the translation test and I think
everybody is just about ready to move to the starboard center of
the payload bay.
CAPCOM      Roger, copy that. Thank you.
SPACECRAFT  How does the camera delta angle look to you, Ron?
SPACECRAFT  It looks good, Bruce. It all depends on where
you're going to end up. If we're looking at the SPAS TPAD we
have a very good view.
SPACECRAFT  That's good on elevation. Bruce.
SPACECRAFT  Okay. I need to come back inside the bay. I'm
getting extremely cold.
SPACECRAFT  Bruce, why don't you move over to the SPAS TPAD
area.
SPACECRAFT  Okay.
END OF TAPE
SPACECRAFT  Bruce, why don't you move to the SPA's T-pad area.

SPACECRAFT  Okay.

SPACECRAFT  Bob, can you break off the hydrazine activity temporarily. Yes.

SPACECRAFT  Okay, why don't you move over to the position we talked about. Thanks, Bob, it would be nice if you'd be on the starboard slide wire itself.

SPACECRAFT  Okay, and down towards the - Okay, on the slide wire.

SPACECRAFT  Down by the SPA's. And, Bruce, status check now.

SPACECRAFT  Okay. Time EV is 4 plus 58, time left is 2+30 with 34% power, 60 percent O2, suit pressure is 4.2.

SPACECRAFT  Okay, and sublimator?

SPACECRAFT  (Garble) point 1.

SPACECRAFT  This position okay, Vance.

SPACECRAFT  Sure, that's fine or just kind of on top, or whatever. Why don't we take a 5 minute break here, and then finish up these tasks.

SPACECRAFT  You want me behind the SPA's or in front of it.

SPACECRAFT  On our side of it.

SPACECRAFT  Okay.

SPACECRAFT  Or over a little closer to Bob, up higher.

SPACECRAFT  Okay. Oh boy, it feels better down here in the bay. Where is, Bob?

SPACECRAFT  Just outside the starboard side. Suppose I confuse the starboard and port a while ago, you know I'm in the Army. You know, we use left and right. I never heard anybody yet say starboard flank march.

PAO  McCandless on the MMU down in the cargo bay. Stewart out on the starboard side.

CAPCOM  Challenger, Houston, we'll let you have camera A to set it up however you like.
SPACECRAFT Okay. Yeah, good, thanks.

PAO Stewart just outside the hinge line on the starboard side of the cargo bay.

SPACECRAFT I agree with your assessment, Vance, what you need is a bubble out here, to sit an observer in, boy the view is just --

SPACECRAFT Now, Bob, you're coming over South America, just crossing the coast.

SPACECRAFT Yeah, there it is, I see it coming up. While I'm down here I'm going to look over the aft part of the bay area again. FR is stowed good and I don't see anything loose in this area. Clean as a whistle.

SPACECRAFT Foot restraints working today Bob?

SPACECRAFT Not very well, that's why I made that crack about having to take training for - to be a kicker for the Oilers. It's improving, I think I'm beating the toes down a little bit.

SPACECRAFT We'll come and watch you playing with the Oilers.

SPACECRAFT I'll be the little guy they carry off on a stretcher--

END OF TAPE
SPACECRAFT -- been trying to check everything out and make sure it's going to well when she does it. The thought of myself going out wasn't bothering me but I think I'll be nervous when she goes.

PRESIDENT REAGAN I can understand that. Do you think she'll enjoy it?

SPACECRAFT I know she'll enjoy it.

PRESIDENT REAGAN Well now, could I ask how are the experiments onboard the Shuttle working out? I understand that you have one dealing with arthritis and other experiments onboard that may lead to advances in manufacturing and various kinds of material processing.

SPACECRAFT Mr. President, the experiments are working out very well. We're very pleased with the results we're seeing and there's a lot of promise being demonstrated in all the areas you've just mentioned and we look forward to getting them back on the ground, analyzed and make some good use of these results.

PRESIDENT REAGAN Well, let me again congratulate all of you onboard the Space Shuttle Challenger. You're doing a fine job. Your commitment and courage on this historic flight I think are an inspiration to all of us. And I know that you have things to do and much more important than getting a telephone call from Earth so let me just say to you have a safe journey home and God Bless you all.

SPACECRAFT Thank you very much for calling, sir. We really appreciate that.

PRESIDENT REAGAN It's my pleasure. All right.

SPACECRAFT We're all proud to be a part of this mission.

PRESIDENT REAGAN All right. Good bye.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Vance.

CAPCOM Challenger, Houston. We had a momentary drop on comm.

SPACECRAFT Roger, that's what we thought. We must have had an attitude change that made it drop out.

CAPCOM Roger, where did the Earth go there, Vance?
Well, we know it's still down there somewhere,
Jerry.

Okay, you're go to continue.

We can see it.

Roger, go to continue.

Vance, while I'm this far down I'm going to go down
and just make a spot check on this side of the vehicle if that's
okay.

Okay.

Yes, I got a sublimator P message. I need a flying
recharge if you could arrange that.

Okay. Be back in just a second, Bruce.

Okay. I've got the water turned off. It says temp
control valve max cold. I don't know if I can take it max
cold. I'm in max hot right now and I'm shivering.

Challenger, Houston. Considering the time, we'd
like you to go ahead and start closing down shop.

Roger.

Mission Control. The crew given the go to begin
concluding the spacewalk which has been going on for 5 hours and
15 minutes.

Okay, Bruce, Bob, we're about 5 minutes and 15 into
the EVA so, like Jerry says, we need to start packing up.

Okay, tell you what. One thing, it'll only take a
second if I could do, is if you put one of the TV cameras on me
let me give you a pure pitch, a pure roll, and a pure yaw for
about 30 seconds. I'm getting a lot of cross coupling it seems
like between yaw and roll. You have me on the other camera?

No. Ron'll let you do that as soon as he gets a
camera set up.

Stewart beginning to pick up some of the EVA tools,
stow them back in the special equipment stowage assembly.
McCandless will be doing some final checkout of the MMU before
parking it again.

Okay. Bruce, he has the camera on you and he's
turning on the VTR.
SPACECRAFT  Okay.
SPACECRAFT  Okay, you're all set.

END OF TAPE
Okay, Bruce, he has the camera on you and he's turning on the VTR.

Okay. Okay, you're all set. And, Bob?

Yes, Vance.

It looks like you're packing up the hydrozene experiment, is that right?

Yes.

Okay, this is going to be a pure yaw left.

Houston Challenger.

Go ahead, Vance.

Good.

Jerry because we, --

Now yaw right.

-- did have a communication drop out there at the end, we didn't get to hear the very last words that the president spoke, but please relay to him, that we certainly appreciated his call. And we're really happy and proud to be the ones - on this flight happened to do this up here for America.

Yes sir, Vance, I think he got all the comm - I think the drop out was shortly after he departed. And Vance, I've got a couple notes for you.

Pure roll left.

Go ahead, Jerry.

Roger, Vance, oh yeah, I've got it. Okay. First of all at MET 4+30, you can delete the flash evap controller, primary A to off, you can delete that. Also, at the end of the EVA we would like to leave the COAS installed. And the third item, we see the flight deck camera getting hot again, we'd like to turn it off.

Okay, we'll turn it off. We're leaving the COAS installed. It'll be there in note on the flash evap.

Camera role on cinema 360 while your over there.

Bruce.

Okay.
SPACECRAFT: (Garble) a little higher.

SPACECRAFT: Bruce, have you got a spare wrist tether?

SPACECRAFT: Yeah.

SPACECRAFT: I need that one to close out here.

SPACECRAFT: (Garble) you on the 35 millimeter camera, you're getting close to the gas can.

SPACECRAFT: After pure pitch this will wrap it up.

CAPCOM: Challenger, Houston, I have a SPA's note for you.

SPACECRAFT: Okay, go ahead on the SPAS note.

CAPCOM: Okay, Hooter, we need to do this as soon as you can get to it. SPAS RP deactivation, that's page 6-11, of the payload Ops checklist. All steps --

SPACECRAFT: Okay.

CAPCOM: -- disregard the second note, on page 6-12. Second item, SPAS activation --

SPACECRAFT: You think you can hand me one of those tethers, (garble)

SPACECRAFT: SPAS activation page 1-2 of the payload Ops, perform all steps. Third item, after EVA, SPAS batteries off. That's the switch on the SSP.

SPACECRAFT: Okay, Jerry, I got about 1/4 of all that, because of EVA comm going on, you are going to have repeat it at some point.

SPACECRAFT: 360 is rolling.

CAPCOM: Okay, we're 4:45 to LOS, I'll try again. First step, SPAS RP deactivation, page 6-11. Perform all steps, disregard second note on page 6-12. Perform SPAS activation page 1-2, the payload Ops, all steps. After the EVA SPAS batteries off, using the switches on the standard switch panel, over.

SPACECRAFT: Okay, Jerry, SPAS FR deactivation, 6-11, all steps, disregard the second note, 6-12. SPAS activation page 1-2, all steps, after EVA SPAS batteries off.

CAPCOM: That's a good read back, Hooter, we're 3 1/2 to LOS, Guam next, at 03+11.

END OF TAPE
CAPCOM: That's a good read back, Hooter, we're 3 1/2 till LOS, Guam next at 03+11.

SPACECRAFT: A couple of the holds.

SPACECRAFT: Yeah.

SPACECRAFT: We know which ones they are.

SPACECRAFT: Yeah, the list, just let me check to make sure we have the right (garble).

SPACECRAFT: Okay, a few holds empty, one contains the multipurpose 2, and one contained the ball valve assembly. I'm going to leave the flashlight out here.

SPACECRAFT: Okay, very good.

SPACECRAFT: And let's see the T-pad is stowed and locked and everything looks great.

CAPCOM: Challenger, Houston, a reminder we'd like to have adjustable wrist tethers on both the portable foot restraints.

SPACECRAFT: Did you catch that EV 1 and 2?

SPACECRAFT: Yes we (garble).

PAO: McCandless now docking his MMU into the flight support station.

SPACECRAFT: (Garble) locked into the FSS. Where's the MMU valve checklist? THC clockwise, plus X for half a second. Power A and B off. Clockwise.

PAO: Bob Stewart installing a wrist tether on the foot restraint. This is Mission Control 6 days, 2 hours, 50 minutes. We're about to lose contact with the Challenger through the tracking data relay satellite. Pick up again in about 21 minutes over the Guam station. Crew is closing out their EVA activities. Mission Specialist Bob Stewart has stowed the tools and the equipment in the special equipment stowage assembly, and was installing the portable wrist tether on the foot restraint. Bruce McCandless had docked his MMU into the port flight support station, and was – –

END OF TAPE
PAO - Special Equipment Stowage Assembly and was installing the portable wrist tether on the foot restraint. Bruce McCandless had docked him MMU into the port flight support station and was locking it in place. EVA has been underway for about 5 and 1/2 hours and the crew will be closing out that activity very shortly and reentering the airlock. During the last pass, of course, they got a message, a phone call from the President calling from California to congratulate them on their activity. This EVA marked primarily by the engineering checkout of the Manned Maneuvering Unit and the operation of the hydrazine transfer test. One of the planned activities, one of the, what would have been one of the highlights of this EVA was cancelled due to an equipment problem. The crew was due to dock, practice docking with a slowly rotating SPAS on the end of the Remote Manipulator Arm and due to a malfunction in the arm that task was unable to be conducted. Spacecraft is in a 156 by 149 nautical mile orbit and at the very end of orbit #98. They'll start orbit #99 as they cross the Equator in about 5 minutes or so. We're 18-1/2 minutes from picking up communication again through the Guam station at 6 days, 2 hours, 52 minutes this is Mission Control Houston.

CAPCOM Challenger, Houston through Guam for 6. 

SPACECRAFT Roger, Houston. Bob is presently taking everything inside. Bruce is just about to finish up on tying down the MMU.

CAPCOM Roger copy that Vance. Be advised we're sending you a couple messages, 64 and 65. 65 has reconfigurations of DAPs and uses thereof for maneuvers before sleep tonight.

SPACECRAFT We've gone to DAP A. Very shortly I suppose you'd like to have us go to the no vernier aft check configuration, is that, as soon as we get everybody in. Is that correct?

CAPCOM Well, that's essentially it Vance. If you can refer to 65 when you get it, it'll have the complete story for you. 64 tells you what we've learned about the CG calculation question you had earlier in the day.

SPACECRAFT Okay.

SPACECRAFT Okay Vance, the MMU camera is inside.

SPACECRAFT What did you say on the inside Bob?

SPACECRAFT The MMU camera is inside and stowed.

SPACECRAFT Okay, thank you.

SPACECRAFT Okay and Bob on the (garble) MMU, do you verify that both of those EN2 QDs are in the closed to flow position?
SPACECRAFT: That's affirm.

SPACECRAFT: Okay.

SPACECRAFT: Think you got the launch bolts in Bruce.

SPACECRAFT: Yes, oh yes. They're in.

SPACECRAFT: Did you get 4 in on the other side too, you and Bob?

SPACECRAFT: Just 2 on each side.

SPACECRAFT: Top 2, right?

SPACECRAFT: Right, top 2.

END OF TAPE
Looks like you got the latch bolts in, Bruce.

Yeah, oh yeah, they're in.

Did you get 4 in on the other side too, you and Bob.

No, just 2 on each side.

Top two, huh?

Rogjt top two. And I'm just putting the velcro on (garble). I did turn my sublimater back on.

Challenger Houston.

Okay. Okay, Houston.

Roger, Vance, we would like the MADS strain gages back to on. And be advised we think you might get a cabin pressure message when you repress the airlock, if you like you can bump up your pressure a little bit with N2 before you do that.

Okay, understand. About how high would you suggest 10.5?

That sounds good to us.

Okay, the strain gage PCM enable is on.

Roger, thank you.

What else do we got to do to close out this place?

Well, I looked in both bays, and I couldn't see anything loose.

What about the thruster cue light extension, did you three of those in.

I got one in the airlock and 2 of them are tethered to me. Oh, I got to restrain my side wire up by the (garble) mechanism. Payload bay door. (Garble)

Challenger, 30 seconds till over the hill, Hawaii in 7.

Roger, Houston.
SPACECRAFT Camera delta aimed and tilt where you want it for the last time?

SPACECRAFT Okey, and I guess the main thing is just to recall whether any tool was left out as a result of the camera delta, and slide wire operations. I guess the hammer is back for example, right?

SPACECRAFT Yeah, the hammer is back, we can, I can account for everything that we've brought out on this EVA, Vance. There's still one tether missing of stuff tha we brought in last time, that I can't account for.

SPACECRAFT Was it missing before the EVA, the second EVA?

SPACECRAFT Yes. It was the tether that was originally on the foot restraint.

PAO This is Mission Control, at 6 days, 3 hours, 18 minutes, mission elapsed time. We have loss of signal through the Guam station, and we'll pick up in about 6 minutes over Hawaii. The crewmembers are about to get back into the airlock, bringing in the cameras. And making sure that everything is tied down out in the payload bay, before concluding this EVA. We're right about 5 hours, 55 minutes, into the EVA, which was the length of the first spacewalk, on flight day 5. The next spacecraft television will be on orbit 99, coming up at central standard time 10:33, that will be payload bay views using the payload bay cameras. Perhaps some views of the earth as well. We're 5 and 1/2 minutes away from the Hawaii pass, this is Mission Control Houston.

PAO Mission Control standing by for acquisition through Hawaii.

CAPCOM Challenger, Houston, through Hawaii for 7 1/2.

SPACECRAFT Roger, Houston, Bob's in the airlock and Bruce is just coming in.

CAPCOM Roger, and a reminder to get another EMU status full list.

SPACECRAFT We'll do that before they close the hatch.

CAPCOM And further on that, Vance, we'd like to the status check before the water --

END OF TAPE
CAPCOM And further on that, Vance, we'd like to do the status check before the water is turned off.

SPACECRAFT Bruce, Bob, whenever's a convenient time I'm standing by for the status check before the water's turned off.

SPACECRAFT Okay.

SPACECRAFT You ready to copy mine, Vance?

SPACECRAFT Ready.

SPACECRAFT Time EV 6 hours 1 minute. Time left 1 hour, 24. 19% power. 43% O2. (garble) is 4.3. 02 (garble) is 412. (garble) pressure 6050. Sublimator pressure 2.7 —

SPACECRAFT Just a second, just a second, Bob. There's one number I missed but, okay go on from here and I'll have to back up. The time wasn't too clear.

SPACECRAFT Sublimator pressure 2.7. Battery volt 16.5. Battery amps 3.4. RPM 20,000. CO2 .2. Temperature 48. Gas pressure 15, water pressure 15. What did you miss, Vance?

SPACECRAFT Okay, right after the suit pressure 4.3 there were 3 readings and there was some static and I couldn't catch one of the (garble) temps.

SPACECRAFT Okay here they come. O2 pressure 411, 411. (garble) pressure 6110. It's fluxuating, going up and down, 6140 now. Sublimator pressure 2.9.

SPACECRAFT Okay, good.

SPACECRAFT There's a thermal hatch cover or the thermal hatch protector closed?

SPACECRAFT It appears to be closed from the outside. I can see it moving.

SPACECRAFT It's closed though isn't it.

SPACECRAFT It's closed but it just looks like it's being tugged on. See if you flex a little bit.

SPACECRAFT I'm tugging on it now trying to use the velco on it. It's pulled out a little bit but (garble) like that.

SPACECRAFT It certainly looks like it's a thermal protector, a complete thermal protector from the position that it's in now.

SPACECRAFT Okay.
SPACECRAFT: Okay. Stowed tether lines. (Garble) airlock, wrist tether (garble) ingress airlock. Water off?

SPACECRAFT: Yes the water goes off the status check.


END OF TAPE
SPACECRAFT — SLP pressure 6090. Sublimator pressure 2.6, batt volt 16.7, batt amps 3.4, RPM 19.8 going to 20.0. PR2 0.3 milimeter, water temperature 54 degrees, 54. For the gas pressure is 15.3, that's 1 5 point 3. The water pressure is 14.9, 1 4 point 9.

SPACECRAFT Thank you, Bruce.

SPACECRAFT Copy. Okay water is off. (Garble) closed and locked. Are you clear?

SPACECRAFT (Garble) scrunched up as much as I can. (Garble) I'm all the way to the top.

CAPCOM Challenger, Houston, 30 seconds LOS Hawaii, TDRS in 2 minutes.

SPACECRAFT Roger, copy, Jerry.

SPACECRAFT Outer hatch closed and locked.

SPACECRAFT Okay is it time for water off?

SPACECRAFT Yeah water off, I'm sorry, I thought you caught that.

PAO This is Mission Control and we have a brief gap in communications, before we pick up through tracking data relay satellite in just a minute, or less. We'll have some television from the spacecraft payload bay views, crew now in the airlock, and hooking up their EMUs to the stations in the airlock. We'll have a time before the conclusion EVA, it's a little over 6 hours, we'll get the exact time a little bit later.

SPACECRAFT It's (garble)

SPACECRAFT Okay, here you come. Aren't we going to see what it was worth for us to do that.

PAO Airlock pressure coming up now. About 1 lb now. Once the outer hatch to the payload bay door is closed, the inlet valves on the hatch from the middeck to the airlock are opened and the pressure slowly evens out between the two.

SPACECRAFT Stop at 5. Give me some more, I'm reading 4.0. 4.7, 4.8, 5.0. Close the valve. Close the valve, please.

SPACECRAFT Okay.

SPACECRAFT Okay, let's see (garble). Okay, 2 minutes, delta pressure check.
PAO  At this point they stop the airflow into the airlock to do checks on the suits.

SPACECRAFT  And I got our clocks running here. You can do it anytime, disconnect wrist tethers, (garble).

CAPCOM  Challenger, Houston, through TDRS.

SPACECRAFT  Roger, Houston.

END OF TAPE
CAPCOM Challenger Houston through TDRS.

SPACECRAFT Roger, Houston.

SPACECRAFT Vance, if I have to take the pressure a little bit slow this time because I've got an airlock.

SPACECRAFT Bruce have you disconnected us, our tethers?

SPACECRAFT Ah, no I haven't but I seem to missing the tether on my left ring string. Have I two on my right ring?

SPACECRAFT Let's see what we got here. No, your missing one.

SPACECRAFT (garble) What happened to the one that was attached to the --

SPACECRAFT -- to the rest of this depress EVA 1 and 2, would you go to DTT?

SPACECRAFT Now wait a minute Vance, we seem to missing a wrist tether. Ah I hooked up and tethered to you right?

SPACECRAFT Yes.

SPACECRAFT And then --

SPACECRAFT Did you leave one outside?

SPACECRAFT I don't see how I could have. Can you see the setting of the airlock hatch, with the RMS elbow camera, see if there is a wrist tether out there.

SPACECRAFT Okay it would be attached probably to the hatch rail?

SPACECRAFT Ah, I don't know where it would be, because I took the, I took the -- there it is, there it is!

SPACECRAFT There it is!

SPACECRAFT Yes.

SPACECRAFT How did it get over there? You must have unattached that one thinking you we're releasing us.

SPACECRAFT Yeah, Okay.

SPACECRAFT Ok, you just detached the wrong one.
Okay. Counts even. Okay there's more than 2 minutes in 5.4, let's see what else we've got on the card. Okay. Uncovered D and C. SCU ports.

Ok, my D and C is uncovered.

Sounds great, connect to SCU.

(garble)

McCandless and Stewart in the airlock with the pressure at 5.4 psi. For a few moments they thought they had left one of the wrist tethers outside, they seem to have found that now.

Yeah, I'm connected to my SCU.

I got it, but I'm not connected yet. Okay. Connected. Okay, O2 actuator to IV.

Ok on the IV.

Okay, on airlock wall 82, EMU 1 and 2 O2 valves open, please.

Bruce, say that one again.

(garble), O2 valves to open.

(garble). And over there, in the electrical panel, power back charger to the check it's in the power mode and bus select 2 and 1.

Okay, they're on.

Okay, I'm going to --

Vance, give us a mark when we should do that SCU power and that will end the EVA. Log the time.

Standby one.

END OF TAPE
SPACECRAFT -- and bus select two of them on.
SPACECRAFT Okay, they're on.
SPACECRAFT Okay --
SPACECRAFT (Garble) on A.
SPACECRAFT They have to give us mark when we should do that
SCU power and that'll end the EVA, log the time.
SPACECRAFT Stand by one. Okay, yes. Let's turn the power
switches, the power bat --
SPACECRAFT Just give us a mark.
SPACECRAFT Mark.
SPACECRAFT Okay. Okay. Power the SCU, okay. Yes.
PAO McCandless and Stewart now back on Spacecraft power
for their EMUs.
SPACECRAFT (Garble) get the cabin pressure. Why don't you
control it since you got ear problems.
SPACECRAFT No, that cleared but I'll control it anyway.
SPACECRAFT Okay, hey go to, go to PTT though before you do
that will you because we can't hear you with all the noise out
here.
SPACECRAFT Okay.
PAO EVA concluded after 6 hours, 17 minutes.
SPACECRAFT (Garble) control it Bob.
SPACECRAFT Thanks a lot. Where was it.
SPACECRAFT Seen it floating by.
SPACECRAFT (Garble). Okay. (Garble)
SPACECRAFT Stand by one. We got a lot of noise for pumping
pressure in here.
CAPCOM Challenger, Houston. We'd like an action for heat
pipe please.
SPACECRAFT Okay, back on. We had to make an adjustment to
cabin pressure. Okay, next step.
SPACECRAFT  The next step is open the hatch when you get the equalization, when you get the pressure equalized and then go to a post EVA, EVA checklist.

SPACECRAFT  Let's go hardline.

SPACECRAFT  Houston, Challenger, were you calling?

CAPCOM  That's affirm, Hoot. Several things for you.

SPACECRAFT  Okay, Jerry, ready to copy.

CAPCOM  Okay, first one. We've tried to turn on the heat pipe down from the ground. Doesn't seem to work right. We'd like you to go to spec 220 and do an item 23 for us. Secondly, now that you're out of low 2 you'll need to reselect all of your uptiring jets. And when you've got a couple minutes I've got some other notes for you on cabin repress.

SPACECRAFT  I got you weak but readable, Vance.

SPACECRAFT  Okay, Jerry, go ahead with your other notes.

SPACECRAFT  But before you start that I want to verify spec 23, spec 220, item 23, that's heat power experiment.

CAPCOM  That's affirm, Ron. We want it on.

SPACECRAFT  Okay, go ahead with Hoot's messages.

CAPCOM  Okay Hoot, cabin repress and that's the contingency EVA OPS checklist pages 5-7. We would like you to, on that page, to delete reference to panel M032M and the 02 bleed orifice. When the cabin pressure is back at 14.7 psi we'd like to return to manual ops and do that by on IMO 1OW 14.7 can reg inlets system 1 and 2 to close. And on L2, 02 N2 controller. Valve system 2 to close. And then you can delete orbit ops checklist call out there, over.

SPACECRAFT  Okay, Jerry, we got the heat pipe. We're doing that. We're going to reselect all the uptiring jets. Contingency EVA 5-7 to repress the cabin. Delete the reference to M032M. When we get back to 14.7 we'll go back to manual ops closing the two 14.7 regs on MOD0W. L2, we're going to take the 02 N2 controller for system 2 to close.

CAPCOM  Okay, Hoot, that's good and you can delete the orbit ops checklist call out in those procedures and also on spec 77, when you get a chance, we'd like you to read down the MMU temps for us.
SPACECRAFT  You'll get some right after I hook the umbilical back up on the --

END OF TAPE
CAPCOM: Okay, Hoot that's good, and you can delete the orbit Ops checklist, call out on those procedures. And also on spec 77, when you get a chance we'd like you to read down the MMU temps for us.

SPACECRAFT: We got some right after I hooked the umbilical back up on the pot one so it should be interesting.

SPACECRAFT: Okay, my 02 actuator is off, purge valve's open.

SPACECRAFT: Are you talking to us, Vance? You're very, very weak. Okay, hang on. The 02 is off, purge valve is open. I can't hear you over the noise of the water tank here.

PAO: This is Mission Control, Challenger crossing the coast of South America now. Orbit number 99.

SPACECRAFT: That's not bagged, Vance, that's the file TA stowage assembly.

PAO: And we see the coastline of South America, as the Challenger crosses the coast. At about 12 degrees south latitude. McCandless and Stewart preparing to get out of there suits. Or at least open them up in a few moments. The airlock has been repressurized, the EVA concluded after 6 hours, 17 minutes. That time measured from the moment that they go on the EMU or the suit's internal power until the time that they go back off that power onto the Orbiter supplied power.

SPACECRAFT: I can read you those spec 77 temps if you're ready.

CAPCOM: Okay, Hoot, we're ready to copy those.

SPACECRAFT: Okay, the ones I'm going to read you are the ones I'm reading right now, let me read you all the ones down on the left column, and then I'll read you all the ones down on the right column.

CAPCOM: Copy.

SPACECRAFT: Okay, from the left column, 86, 77, 29, 19, 12, 5, 44. And running down the starboard column, 93, 110, 22, 24, 12, 12, 42.

CAPCOM: Okay, Hoot, we got all those, thank you.

SPACECRAFT: (Garble) where it says (garble) operations. (garble). 02 off so we ought to turn the (garble) off.

SPACECRAFT: Yeah (garble) then the other. (garble) working.
This is Mission Control Houston, at 6 days, 3 hours, 56 minutes. Mission Specialist Bruce McCandless and Bob Stewart concluding activities in the airlock there they will be getting out of their suits shortly —

END OF TAPE
PAO     - - 3 hours, 56 minutes. Mission Specialists Bruce McCandless and Bob Stewart concluding the activities in the airlock there. They will be getting out of their suits shortly. Suits are, again, mounted on the walls of the airlock and they are getting their cooling supply and their electrical power and oxygen from the Orbiter, the mounting stations there in the airlock. The EVA lasted for 6 hours, 17 minutes today. That's about 20 minutes longer than the EVA on flight day 5. Had an unexpected demonstration of the MMU rescue capability on this EVA today. As McCandless was working with one of the portable foot restraints, it slipped off of a mounting and began moving away from the Orbiter on its own, became a free-flying satellite and the crew decided to go get that using the techniques that they would use should it ever become necessary to rescue an MMU astronaut out flying his MMU who would have some sort of failure and be unable to return, the Spacecraft would go get him. That same set of techniques was used in retrieving the foot restraints. Commander Vance Brand maneuvered the Orbiter using the thrusters to match up with the drifting piece of hardware and Astronaut Bruce McCandless moving down the starboard hinge line, managed to reach out and grab the floating foot restraint as the Orbiter moved up to it. That was a fairly efficient operation in that it only used about 150 pounds of propellant to put the Orbiter through that maneuver. The Orbiter currently weighing well in excess of 200,000 pounds. We are expecting to hold a Change-of-Shift Press Conference in about an hour here in the Johnson Space Center Press Conference room 135 in building 2 and that would be with the Flight Director John Cox who has been directing the activities in Mission Control for the duration of this spacewalk today. He will be available for a Change-of-Shift Press Conference about an hour from now and we'll keep you advised as to the actual set up with the time on that and any other participants in that briefing as we get a little closer to that time. Challenger now moving out off the coast of South America out onto the open Atlantic. We're getting television relayed to us by the payload bay cameras as relayed to the tracking data relay satellite and back down to the White Sands New Mexico ground stations.

END OF TAPE
SPACECRAFT  Houston, Challenger.
CAPCOM    Go ahead, Vance.

SPACECRAFT    Jerry, we have Bob and Bruce out of their suits, and they're continuing on now with the post-EVA, and Hoot showed me the CG message here, makes you believe that I'm the HB and on the CG wheel, maybe the generic approach doesn't hack it.

CAPCOM    Yes sir, that's a gotcha I think we're going to have to fix for the future.

SPACECRAFT   (garble) That is to say, it's suppose to work in a generic fashion, by being specific for a mission, but in this case it, that just didn't work out.

CAPCOM    Right, we just dropped one somewhere.

PAO    Mission Control at 6 days, 4 hours 15 minutes. Approaching darkness now. The Challenger just a few moments ago, crossed the coast over southern part of the African continent, and now is leaving daylight and entering the shadow side of the earth --

END OF TAPE
PAO            -- and entering the shadowed side of the Earth.

CAPCOM        Challenger, Houston. We're 7 minutes LOS TDRS.
Guam next at 04 49. At LOS we would like to go on panel C3 S-
band PM rotary to GPC, please.

SPACECRAFT    Okay, Jerry. We'll get that at LOS we'll take you
to GPC.

CAPCOM        Roger, Hooter.

PAO            Mission Control Houston, 6 days, 4 hours, 20
minutes mission elapsed time. Challenger passing into darkness
now, the last remains of daylight visible behind the
spacecraft. Some light still glinting off some of the objects in
the payload bay. Astronauts McCandless and Stewart are out of
their suits now and are concluding with their airlock
activities. Stowing the equipment brought back in from the
spacewalk. We have a little less than 5 minutes remaining in the
pass with the tracking data relay satellite. Challenger about 8
or 10 minutes away from the start of orbit #100. We'll pick up
again in 27 minutes through the Guam station. This is Mission
Control Houston.

PAO            This is Mission Control. We're about 2 minutes
away from losing the communication with the Spacecraft through
the TDRS. We've been passing over Madagascar and seeing some
lightening and thunder storms down below. This is Mission
Control 6 days, 4 hours, 26 minutes. We have loss of signal
through the tracking data relay satellite. We'll pick up again
in 22 minutes over Guam. That's a pretty low elevation pass,
about 2 and 1/2 degrees maximum elevation although we show it as
total contact about 2 minutes and 44 seconds during that pass.
The next pass after that of any size is Hawaii 32 minutes from
now. The EVA has been concluded. Flight Director John Cox who
was presiding over the activities in Mission Control during the
spacewalk is preparing for his Change-of-Shift Press Conference
to occur in about a half an hour from now in building 2 here at
the Johnson Space Center. He'll be going over for a press
conference at about noon today central time. Challenger has
passed out over the Indian Ocean and is about to start orbit #100
of this space flight. We'll hear from the crew again in about 21
minutes. This is Mission Control Houston.

PAO            This is Mission Control Houston at 6 days, 4 hours,
41 minutes. Change-of-Shift Press Conference with John Cox,
Flight Director during the EVA period is scheduled for noon
central standard time or in about 19 or 20 minutes from now.
Along with Cox will be Ed Witssett the MMU subsystem manager.
We're about 8 minutes away from picking up over the Guam
station. This is Mission Control.
CAPCOM Challenger, Houston, with you through Guam for 3 minutes.

SPACECRAFT Hello, Mary, you're loud and clear through Guam. We're in the midst of the cabin repress to 14.7.

CAPCOM Copy that, thanks.

CAPCOM Challenger, Houston. We're about 30 seconds LOS here at Guam and we can talk to you through Hawaii at 4:59. Before TDRS AOS we're going to need on C3 your S-band PM antenna to GPC, over.

SPACECRAFT Okay, will do.

END OF TAPE
CAPCOM  -- at Guam and we can talk to you through Hawaii at 4:59. Before TDRS AOS, we're going to need on C3 your S-band PM antenna to GPC, over.

SPACECRAFT  Okay, will do.

PAO  Mission Control Houston, 6 days, 4 hours, 58 minutes, had a very slight delay in the Change-of-Shift Press Conference with the EVA Flight Director, John Cox. Cox is getting a current weather update now here in the Control Center and will be bringing that information over with him when he comes in 10 or 15 minutes. That will be approximately 12:10. Along with Cox we expect to have Ed Whitsett, the MMU subsystem manager, who can discuss the operations of the manned maneuvering unit as used today in the spacewalk. We're about 30 seconds or so from reacquisition through Hawaii, Hawaii station, and we'll be checking on the progress of the crew in stowing all their equipment from the recently completed spacewalk. This is Mission Control.

CAPCOM  Challenger.

SPACECRAFT  Mary.

CAPCOM  Challenger, Houston with you through Hawaii.

SPACECRAFT  Houston if that's you calling, we're hearing your mike key, but then we don't hear anything.

CAPCOM  Challenger, Houston with you through Hawaii. Sorry about that, had a mike problem.

SPACECRAFT  Okay, loud and clear.

CAPCOM  And we're with you for 7 here.

SPACECRAFT  Cabin's back to 14.7 as you can see.

CAPCOM  Copy that.

SPACECRAFT  Okay, it's in effect now, it's hard to breathe.

CAPCOM  I don't think I got my head fixed, but I got my mike fixed.

SPACECRAFT  Incidentally just an interesting note. When we, in the first part of the mission when we had 14.7 psi dropping, we generally set the cabin temp to full cool at night to sleep. We found with 10.2, that it had to be two thirds of the way towards full hot.

CAPCOM  Copy that thanks, that's good info.
CAPCOM       Challenger, Houston.

SPACECRAFT   Go ahead.

CAPCOM       Roger Vance. I would like to request since you have to good stars, 20 and 22 in your table and the torquing angles look good, that you go ahead and do a star opportunity align it this time.

SPACECRAFT   Okay, we'll just use the data that appears then and skip the maneuver to align the star.

CAPCOM       That's affirmative.

PAO          Mission Control Houston, 6 days, 5 hours, 4 minutes. Commander Vance Brand reports that the cabin has been repressurized to the full normal pressure 14.7 psi. And they're going to align the IMUs using a pair of stars that they presently have a fix on to avoid, that way that prevents them from having to do another alignment later on and having to use propellant to go to align attitude. Presently passing right down over the Hawaiian chain of Islands. We have about 2 and 1/2 minutes remaining in this pass. We'll have a brief loss of signal and then pick up again over the tracking data relay satellite. In about 5 minutes or so we will be starting the Change-of-Shift Press Conference, EVA Flight Director, John Cox, who worked this mission specially on the EVAs, will be in the press conference room in building 2, here at Johnson Space Center for a press conference covering the EVA period.

END OF TAPE
--the Change-of-Shift Press Conference, EVA Flight Director Jon Cox who worked this mission especially on the EVAs will be in the Press Conference Room in Building 2 here at Johnson Space Center for a press conference covering the EVA period.

-- Houston, Challenger.

Challenger, Houston.

Do you have the numbers, Mary?

That's affirm, Vance. We've got all the numbers we need here.

Okay, we won't read down the IMU align to you then, and Hoot reports that Mauna Loa and Mauna Kea have snow on them in Hawaii. He didn't think they did a couple of days ago.

That's real interesting. I didn't know it snowed in Hawaii.

Well that's up around 13 or 14,000 feet.

Roger, copy. Challenger, Houston. We're about 30 seconds LOS. We'll drop you for a couple of minutes and then pick you up through TDRS.

Okay.

Challenger, Houston checking back in with you through TDRS.

Roger Houston. Houston, Challenger.

Challenger, Houston.

Looking ahead to our maneuver to the -ZLV tail forward attitude at 7:20, do you want to delete that 10 degree wide deadband at that time and go back to the standard A6? Right now we have an A6 DAP with 10 degree wide deadband.

Challenger, Houston. Vance, they wanted to leave it on the 10 degree deadband for sleep tonight. They thought that might be better than the 5 degrees you slept with last night and they were sort of wondering how it was sleeping in tail only last night.

Okay. Well, that'll be real fun. I haven't polled the crew but I don't think we had any trouble sleeping. I know I could hear a muffled boom once in a while but it didn't bother me at all. And Hoot says it didn't bother him.
CAPCOM That's good, then 10 degrees is a good enough deadband for us.

SPACECRAFT Very good, we'll leave it at 10.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead Mary.

CAPCOM Roger Vance. Got a number of presleep notes to get to you when you're ready to copy.

SPACECRAFT Okay, copy.

CAPCOM Roger. First of all, we don't have to do this now if you're busy doing something else Vance. It's just at your convenience first of all.

SPACECRAFT Okay, well that's okay. We're ready to copy.

CAPCOM Okay, first of all we'd like to go ahead again tonight and inhibit the FDA on decom 4.

SPACECRAFT Okay.

CAPCOM Also, just to get you generally give you an idea what we have planned for this evening before we let you turn in, we'd like to try to do a water dump and I have a note to set you up on that. And then also we'd like you, right before you go to sleep, to do a hot fire on two of your forward verniers and that's so you don't get alarms during the evening. And also sometime before sleep period, when the SPAS folks see temperatures they like we're going to go ahead and have you deactivate the SPAS.

SPACECRAFT Okay, understand things coming up this evening. Inhibit FDA to decom 4. You'll give us instructions on a water dump I presume after we've had some heat soaking on the nozzle. A hot fire on 2 vernier engines and I guess that's because they're cold, is that correct, and deactivate the SPAS.

CAPCOM Roger that's correct and on both counts that water dump is going to be tied into the terminator, we're trying to heat up that side before you go ahead and dump. And also, the hot fires are to avoid alarms.

SPACECRAFT Okay. So --

END OF TAPE
SPACECRAFT —— hot fire on two venier engines and I guess that's because they're cold, is that correct, and deactivate the SPAs.

CAPCOM Roger, that's correct on both counts, that water dump is going to be tied into the terminator we're trying to heat up that side, before we go ahead and dump, and also the hot fires are to avoid alarms.

SPACECRAFT Okay. So we'll get further instructions later then.

CAPCOM Roger, or we can read it to you now, it doesn't really matter.

SPACECRAFT Can you standby just a second. Okay ready to copy instructions on the water dump.

CAPCOM Okay, for this supply water dump, we're going to let you go for, and then for the second sun side, we'd like you to get this heater on, on panel R12, your supply water dump valve enable nozzle heater on, and that's at time 7+00. And then when your nozzle temperature is greater than 300 degrees fahrenheit we'd like you to go ahead and dump by going to R12 taking your supply water dump isol valve open, talkback open. And you can check that your tank bravo quantities decreasing. You should try to start that dump just prior to the terminator to give yourself the maximum amount of sunlight along with the heater on, to try to work on that system. If you don't get a dump, the cleanup is supply water dump isol valve, close, talkback, close. And then take your valve enable nozzle heater off, also. If the dump works, we'd like you to dump tank bravo to 20 percent, and when the dump is complete on R12, take your supply water dump isol valve closed, when the nozzle temperature is greater than 100 degrees, you can take your heater off, over.

SPACECRAFT Okay, Mary, I understood most everything about that, we're going to try and supply water, dump R12, we're going to turn the dump valve enable nozzle heater on, at 7+00 when we get over 300 degrees, we'll go ahead and start the dump by opening the dump isol valve. If the dump does not work then we're going to close the dump isol valve, and we're going to, okay the part after that was the part that I didn't understand.

CAPCOM Roger, if you do not get a dump, we want you to close that isol valve, and then also take the heater off. Your valve enable nozzle heater will go off.

SPACECRAFT Okay, and what was the part that had to do with 100 degrees Mary?
CAPCOM: Roger, if you get a good dump, your to take bravo down to 20 and then when the dump is complete, on take, your supply water dump isol valve close, and then wait for your nozzle temp to heat back up to 100 degrees fahrenheit before you take your nozzle heater back off. Over.

SPACECRAFT: Okay, Mary, you were cut out on that one, say again please.

CAPCOM: Okay, for the third time, we'd like you to take your supply water dump isol valve closed when you get bravo to 20 percent, and then before you take the heater off we want that nozzle heater temperature to get up to greater than 100 degrees, so let your nozzle heat back up before you take your heater off with the valve enable nozzle heater off.

SPACECRAFT: Okay, great, I understand that now, so if we do get a dump we're going to let that nozzle warm back up before we turn the heater back off, so let them get above 100 before we take the heater off.

CAPCOM: That's affirm, and then we've got some clean up also since we got that tank C and D back from the EVA guys that ECCOM would like you to do. When your at R12 you can take your supply water tank C inlet back to open to get back in your std config. Also when your down in the middeck sometime and there is no rush on this, you can take your tank delta outlet to open.

SPACECRAFT: Okay, Mary you cut out during part of that, I think you said take the tank C inlet open, take the D outlet open.

CAPCOM: That's affirm, and that is any time. It's just a cleanup, now that we've got the tanks charlie and delta back from the EVA guys.

SPACECRAFT: Okay, we'll do Mary, thanks.

CAPCOM: That's the end of the supply water dump saga for this evening, and we're ready to give you the venier jet test if your ready to copy.

SPACECRAFT: Standby one.

CAPCOM: No rush on -

END OF TAPE
CAPCOM -- the end of the supply water dump saga for this evening, and we're ready to give you the venier jet test if your ready to copy.

SPACECRAFT Standby one.

CAPCOM No rush on this Vance, have a couple of other notes too. Questions on the Cinema 360, and payload stuff also, if Ron's on the line. And for Hoot, have a couple of questions on the RMS FDI if your still on the line.

SPACECRAFT Yeah Mary, I'm still with you.

CAPCOM Okay, they'd like to talk to you about this while the information is still real fresh in your mind. During that RMS problem, it appeared from the conversation and the fact that the crew continued to drive, after the fault occurred, if, that you may not have heard that alarm, and we'd like to know if you did hear that alarm.

SPACECRAFT Yeah, Mary I wrote that down in my notes for post flight debrief. That is a fact, I did not hear that alarm. We had the movie light on in the cabin, and that movie light made enough noise and the volume on the MCIU, was turned down low enough that I in fact did not hear that alarm, and the reason that I started to look for something, was because the arm wasn't following exactly what I was asking it to do. And I looked back in the cockpit and that's when I saw the (garble) light on.

CAPCOM Roger we copy that, they got an action here, they'd like you to do if you didn't hear the alarm, which is on A8, parameter select to test, then port temperature and you should get an alarm.

SPACECRAFT Okay, well Mary the alarm does work, but the volume is turned way down, and it's just turned down enough that with that cabin movie light going, which has a fan on it, that it just didn't make quite enough noise to be heard.

CAPCOM Okay, Hoot, thanks. Now I understand, just didn't really understand that you weren't hearing the alarm, thanks.

SPACECRAFT Mary, there's a couple comments regarding the EVA over.

CAPCOM Roger, Bruce, ready to copy. And if your going to debrief that tonight though, we'd like to get the times, so we can get a dump and look it over this evening.

SPACECRAFT Oh we will do that, the comment that we're going to give you is, we've put the 2 EMUs on battery recharge, but other than that we have not performed the LiOH cannister changeout, nor
do we intend to, and we have not recharged, perform water recharge, nor do we intend to. We figure that if they're needed for contingency EVA, we can do both of those relatively rapidly, and why cycle the (garble) and use up LiOH cans. We expect to terminate the battery charge sometime tomorrow, over.

CAPCOM Roger Bruce, it's as if you were reading this flight note to me that we're going to give you, send you up to the teleprinter tonight. We concur with all that.

SPACECRAFT Okay, thank you.

SPACECRAFT And Houston, Challenger.

CAPCOM Challenger Houston.

SPACECRAFT Roger, Mary, did you want to give us something then on the hot fire?

CAPCOM Yeah, I'm standing by to read that to you, as soon as your ready to copy.

SPACECRAFT Ready to copy.

CAPCOM Okay, first of all Vance, we'd like you to do this as late as you can in presleep, so the jets don't have as much time to warm up, cause it is because the forward RCS venier jets are cooling down, and we don't want you to get an alarm, a jet leak alarm during sleep. So we'd like you to take the dop to A manual venier and your rotation, excel, excel, excel. Take your RHC and do a positive pitch for 5 seconds, and then reconfigure your dop to A auto norm, and your rotation is discrete, discrete, discrete, over.

SPACECRAFT Okay, Mary, this hot fire should be done late in presleep, dop should be A manual venier, excel, excel, excel, excel, RHC pitch for 5 seconds, and there's something in there I didn't hear, and then back to A auto normal, and discrete, discrete, discrete.

CAPCOM That's a good read back, Vance and that RHC is a positive pitch for 5 seconds.

SPACECRAFT (garble)

END OF TAPE
SPACECRAFT  -- A auto normal and discrete discrete discrete.

CAPCOM   That's a good readback, Vance, and that RHC is a positive pitch for 5 seconds.

SPACECRAFT  Okay Mary, you were cut out. Please say the last.

CAPCOM   Roger Vance. The RHC motion is to be a positive plus pitch for 5 seconds.

SPACECRAFT  Okay, plus pitch 5 seconds in vernier, got it.

CAPCOM   Also have another note from ECOM about your rad controller out temp and working the FES this evening.

SPACECRAFT  Go ahead.

CAPCOM   Roger. On L1 we'd like the radiator controller out temp to normal and then your flash evap primary A cycled off and then on.

SPACECRAFT  In work. And I guess that's because you feel we're in pretty good shape with tank B, 49%.

CAPCOM   Roger, Vance, and opening up the C and D inlets should let it - allow it to spill over if it gets full.

SPACECRAFT  Okay, very good.

CAPCOM   Challenger, Houston, for Hoot.

SPACECRAFT  Stand by. Go ahead, Mary.

CAPCOM   Roger, Hoot. We'd like you to know that tomorrow that PHS DTO is on your call only if you feel that you want to do it and the system's configured properly.

SPACECRAFT  Okay, Mary, you were interrupted by a hammer. Say that again.

CAPCOM   Roger, Hoot. We want you to understand the PHS DTO that's scheduled for tomorrow is on your call only and to be done only if you feel like the system is configured to handle it.

SPACECRAFT  Okay, understand. Thanks a lot, Mary.

CAPCOM   Sure thing.

SPACECRAFT  Mary, isn't that more a question of the redundancy question from the separator?
CAPCOM That's affirm, Vance. If you feel like the separator isn't going to cause you trouble, if it's been working real well and you want to do it go ahead and do it because we can recover flooded separators supposedly. But if you don't want to be bothered, that's fine. We understand because we don't have redundancy you don't need to do the test.

SPACECRAFT Okay.

CAPCOM Challenger, Houston. Got a couple of payloads questions for you. Need the footage that you used for both the cinema 360, both the cinema 360 cameras and also need a GAS group activation time from this morning.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead.

CAPCOM Roger, Vance. Just have a couple more items to clean up here, briefly. We need the footage used in both cinema 360 cameras and then time for a GAS group activation this morning.

SPACECRAFT Okay, we got that. Okay, Mary, we'll get those to you.

CAPCOM Okay, thanks.

SPACECRAFT Ron is right in the middle of a data take right now or else he could give them to you but we'll have to have him give them to you when he's done.

CAPCOM That's fine, just anytime presleep and we still owe you a call when the SPAS needs to be deactivated and otherwise everything's all caught up down here so we'll stop bugging you.

SPACECRAFT Okay, good.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT On this PHS thing, we'd rather defer the decision. We'd like to see how the weather's looking for the next day for landing and we have two volunteers signed up to change the filter if required but we'd also like to have a warm feeling that running that doesn't put stress on our good separator, that might cause our good separator to fail.

CAPCOM Challenger, Houston. Understand that, Vance, sounds like a good plan. We'll update you tomorrow --

END OF TAPE
SPACECRAFT  -- that doesn't put stress on our good separator that might cause our good separator to fail.

CAPCOM  Challenger, Houston. Understand that, Vance. Sounds like a good plan. We'll update you tomorrow on the weather but right now it's looking real good for KSC on Saturday.

SPACECRAFT  Okay, well let's revisit this PHS thing sometime after noon tomorrow.

CAPCOM  Okay, that's fine. Thanks.

CAPCOM  Challenger, Houston. We're going LOS TDRS and we'll talk to you through Guam at 6 26.

SPACECRAFT  See you at 6 26.

PAO  Mission Control Houston. 6 days, 6 hours, 4 minutes mission elapsed time. We've had loss of signal through the tracking data relay satellite. Challenger's on orbit #101 and we are less than 2 hours away from the start of the crew sleep period. Crew will be going to bed about 3 pm central time today. This is the point of the day in which Flight Controllers here in Mission Control begin reviewing the status of the Orbiter systems, set all the appropriate caution and warning limits so that the crew is not awakened during the night. They're reviewing those items now and looking back over the day's EVA activities. Crew will be getting up about 11 pm tonight central time to start their next flight day, flight day 8 and the final full day of the mission 41-B. We're about 21 minutes before reacquiring communication with the Challenger through the Guam station. This is Mission Control Houston.

PAO  Mission Control Houston. 6 days, 6 hours, 25 minutes. Have a brief pass over the Guam station coming up for about a minute and then we'll pick up again over Hawaii. Challenger on orbit #101 at the present time. We're an hour and a half away from the beginning, scheduled beginning of the crew sleep period.

CAPCOM  Challenger, Houston, with you through Guam for 2 minutes.

SPACECRAFT  Loud and clear, Mary.

CAPCOM  Got you loud and clear too. Challenger, Houston. For your information, you should have onboard now your block weather update for this evening and that's message 66.

SPACECRAFT  Okay Mary. We're just waiting for the high power light to go off before we pull the paper so we don't mess up that message in the process of being received.
CAPCOM Copy that. And we're about 15 seconds LOS. We'll talk to you through Hawaii at 6:36.

SPACECRAFT Okay, Mary.

SPACECRAFT Fine thank you. The same to you. (garble)

PAO Mission Control Houston. We just had a brief contact there over the edge of the range of the Guam station and we'll pick up again in about 7 and 1/2 minutes through Hawaii. This is Mission Control.

CAPCOM Challenger, Houston, with you through Hawaii for 5 minutes.

SPACECRAFT (Garble) Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Mary, we're holding off on the hot fire until late in presleep like you requested. Question, would you like to particularly view that or are you happy if we just run off and do it by ourselves?

CAPCOM Let me check on that for you. Challenger, Houston. Vance, that's not --

END OF TAPE
SPACECRAFT  like you requested, question would you like to particularly view that, or are you happy if we just run off and do that ourself.

CAPCOM  Let me check on that for you. Challenger, Houston, Vance, that's not necessary. They can get it through playback.

SPACECRAFT  Okay, good.

CAPCOM  And Challenger Houston, on your SPAS deactivation time?

SPACECRAFT  Okay, go ahead.

CAPCOM  Roger, Vance, you're clear to deactivate the SPAS by the payload Ops checklist page 5-2, any time after 7+00.

SPACECRAFT  Okay, copy that.

CAPCOM  Challenger Houston, we're about 30 seconds LOS here at Hawaii and we'll pick you up 5 minutes through TDRS.

SPACECRAFT  Roger.

END OF TAPE
CAPCOM: -- Bruce, well if you're down on the middeck we've got a circuit breaker we need opened if you're ready to copy. It's on ML86 bravo row alpha.

SPACECRAFT: You want it opened?

CAPCOM: That's affirm. The circuit breaker on ML86 bravo row alpha is main A water line heater alpha open.

SPACECRAFT: Yes, I got H2O line heater alpha.


SPACECRAFT: Okay, that's accomplished.

CAPCOM: Okay, Bruce. Just want you to understand that, you know, while you were out EVA they got a message on this heater and that was because of a spike. It went back down, we had 6 good cycles on the heaters and then they just saw another spike. Not enough to give you an FDA. The plan of attack on this one is that we're going to open A. If they still see spikes, the problem is in B. We'll open B and close A, over.

SPACECRAFT: Okay, we copy. Hoot's actually been the one that's been following that more closely and I'll pass it on to him.

CAPCOM: That's firm, thanks.

SPACECRAFT: Houston, Challenger.

CAPCOM: Challenger, Houston.

SPACECRAFT: Hey, Mary, we have a lot of good video left from the last EVA and the one before that that we haven't dumped yet. However, our tape recorder has begun to eat tapes and we probably won't be dumping anymore for the remainder of the mission unless the status of that tape recorder changes. The VTR is on the blink it seems.

CAPCOM: Copy you're having trouble with the VTR consuming tapes.

SPACECRAFT: That's affirmative.

CAPCOM: And Ron, got a question for you on that. Does it seem to operate okay in record?

SPACECRAFT: (Garble) been doing in the play it seems to chew into tape sort of creating a crease in it and eventually stopping. Damaged 2 tapes that way and I have not attempted anymore after that.
CAPCOM  Copy that, Ron.

SPACECRAFT  Hello, Mary. You think we ought to sacrifice an IFM tape for this?

CAPCOM  I'll check on that for you, Ron.

SPACECRAFT  Just kidding.

CAPCOM  It seemed appropriate to troubleshoot that with an IFM tape. Challenger, Houston. We were thinking maybe one of ECOM's tapes may be more appropriate.

SPACECRAFT  Mary, we missed that. What kind of tapes?

CAPCOM  Roger Vance, they were thinking maybe it would be more appropriate to sacrifice some of ECOM's IFM procedures.

SPACECRAFT  Yes, there's an idea.

CAPCOM  And Ron, if you're still available, earlier we requested the footage to be used in both cinema 360 cameras and also the time of the GAS group echo activation this morning.

SPACECRAFT  Is that the footage, you're referring to the footage taken this morning, today?

CAPCOM  That's affirmative. It's a 360 footage taken today.

SPACECRAFT  Stand by, Mary, let me recall one. Taken so much footage with so many cameras today I've got to recollect this.

CAPCOM  Understand that, Ron.

SPACECRAFT  Okay, Mary, I started the day off with 1, with 2 magazines and I now have 1 left and Hoot's figuring it out for me, 2 minus 1. I think what we did was I got some footage of the EVA prep, some footage of some closeups with the 25 millimeter and I did a few seconds of out-the-window during the EVA just before night, going into day pass so I think I have about a, in a time magazine and a part of a partial one left, over.

CAPCOM  Copy that, Ron. They also were wondering how much you used in the bay camera.

SPACECRAFT  Okay, let's see. First EVA I got about 4 minutes worth of MFR/RMF ops. Second EVA I got about, oh, on MMU I'd say about 6, 7 minutes or so so total --

END OF TAPE
SPACECRAFT — MRF RMS OPS. Second EVA got about, oh, on MMU, I'd say about 6, 7 minutes or so, a total, I'm estimating somewhere total anywhere from 10 to 12 minutes total.

CAPCOM Okay, Ron, thanks a lot and also requested that they send their compliments to the photographer. And now all we need is the time for gas group echo this morning.

SPACECRAFT Okay, I'll get those times for you, and I hope the end product, certainly as nice as it looks out the window here. And you can look up, one question for me also, I'm curious, I forgot, how much of the, what's the total capacity of the payload bay camera. How much film do we have left out there, assuming I used 6 minutes of it.

CAPCOM We'll get that info for you and get back to you.

SPACECRAFT And Houston, Challenger.

CAPCOM Go ahead, Vance, Houston.

SPACECRAFT Ron has got to good at running about half a dozen cameras systems at once, that if he ever just had one to do at a time, it wouldn't be enough challenge.

CAPCOM Copy that. Hey, Vance, just a reminder from INCO, during your debrief, if you're going to record that, please verify before you start that on Panel A1, one of the voice record select channel rotary is turned to ICON bravo.

SPACECRAFT Okay, ICON, roger. ICON bravo will be on one of the tape recorders, that's the essence of it, like the other night, right.

CAPCOM That's affirm, they just wanted you to check your voice select channel, rotary to make sure it was being recorded. They really found the dump and going over it, your debrief really helpful.

SPACECRAFT Okay, good, well we talked about it, and after the ground's suggestion that we do, we thought it was a good idea, because a person forgets about 50% of some of those fine points, a couple days later.

CAPCOM Roger, that.

SPACECRAFT Okay, Mary I found my checklist, and gap group, gas group E activation, day 5 19 + 14.

CAPCOM Copy, 19 + 14, thanks.

SPACECRAFT Okay.
CAPCOM And Ron, for your own information they figure you got approximately 2 minutes worth of cinema 360 left in your bay camera.

SPACECRAFT That is really cutting it close, we'll get some earth shots I guess, we'll find some nice terrain and shoot that, if that's suitable.

CAPCOM They concur and like that idea.

SPACECRAFT Okay, Mary, I think I've got it, if we started a day with 2 magazines and we had 1 left, then we would have used one.

CAPCOM Sounds like you're doing real well with this higher math.

SPACECRAFT Higher math for fighter pilots.

CAPCOM I know, Bruce, you wouldn't say higher math for Navy fighter pilots. And Hoot, if you're still on the line, I got a question for you on this water dump procedure.

SPACECRAFT Yeah Mary, go ahead.

CAPCOM Roger, we'd like to verify that the, at 7+00 on R12, the supply water dump valve enable nozzle heater went on.

SPACECRAFT Mary, something happened to my time tone, and I didn't turn it on. I'll turn it on now.

CAPCOM That's fine, and we just wanted to get as much heat until you get to the terminator, when you commence trying to dump that system, not really a problem and it must have been because you were busy with your higher math.

SPACECRAFT Well I knew that, yes I knew that while I was working on higher math, I wouldn't possibly be able to remember something like that, so I sat a tone on it, but it didn't go off for some reason.

CAPCOM Understand no problem with it, don't worry. Challenger, Houston, with a question on the SPAS deactivation.

SPACECRAFT Go ahead, I think everybody is listening, Mary.

CAPCOM Okay, on, I know that in the flight note we said that you were go to deactivate the SPAS using the payload SPA checklist 5-2, any time after 7+00, but then payload guys would sort of like to see you do it. We've got about 9 more minutes in this - END OF TAPE
CAPCOM  Okay. I know that in the flight note we said that you were go to deactivate the SPAS using the payload ops checklist 5-2 anytime after 7 plus 00, but the payloads guys would sort of like to see you do it. We got about 9 more minutes in this TDRS pass, otherwise it'll have to wait until Guam.

SPACECRAFT  Okay, we'll go do it, Mary.

CAPCOM  Thanks, Hooter.

SPACECRAFT  (Garble) a shrimp cocktail, Hoot, if you don't get back in time?

CAPCOM  And Hooter, Houston. Sorry to break into your appetizer like that but shrimp are high in cholesterol anyway.

SPACECRAFT  Hey Mary, is there something wrong with our supply water dump nozzles, nozzle heaters? I'm showing only 29 degrees on those guys.

CAPCOM  Roger, Hoot, and we're looking at that data right now and we're checking on it for you.

SPACECRAFT  Okay.

CAPCOM  Challenger, Houston for Hoot. They think that there might be some sublimation out that nozzle. They're losing heat which is what they were trying to do to get ice out of that line and they want to continue with it.

SPACECRAFT  Oh, okay. So maybe that even looks promising.

CAPCOM  Well, we're hoping you're right.

CAPCOM  Challenger, Houston. We're about 40 seconds LOS off of TDRS and we'll talk to you again through Guam at 7 plus 59.

SPACECRAFT  Okay Mary, see you there.

PAO  Mission Control Houston. 6 days, 7 hours, 40 minutes mission elapsed time. We have loss of signal through the tracking data relay satellite on orbit number 102. Some final conversations with the crew before they get into their scheduled sleep period in less than 20 minutes. The Payloads Officer reports that the crew has deactivated the shuttle pallet satellite and its associated experiments. Also they are seeing some apparent changes in the water dump nozzles on the water tanks believed to be frozen. They've been operating the heaters there and having the vehicle with the side of the vehicle exposed to the sun to attempt to warm that up. They've been managing the reduction in the water coming into those tanks from the fuel.
cells by various means such as using the water spray boilers and they hope to be able to melt what is apparently some ice blockage there. That's been going on for a couple of days and the Flight Controller here in Mission Control responsible for those systems reports some apparent movement there. Again, crew has only about 15 minutes remaining before they get into their scheduled sleep period. Flight Controllers here have reviewed the status of the systems onboard the Challenger trying to get everything squared away for the night. Everything seems to be going normally onboard the Challenger and the crew reported just a few moments ago that they were eating their dinner. We'll be picking up again in about 16 minutes through the Guam station. It's about a 6 minute pass. We may hear from the crew, probably be putting the crew to bed at that time. At 6 days, 7 hours, 43 minutes this is Mission Control Houston.

PAO Mission Control Houston. 6 days, 7 hours, 54 minutes mission elapsed time. The Change-of-Shift Press Conference with the off-going Flight Director Harold Draughon has been cancelled. That Change-of-Shift Press Conference had been set for 4:30. Draughon was presiding over some of the activities here in Mission Control --

END OF TAPE
PAO Mission Control Houston, 6 days 7 hours 54 minutes, mission elapsed time. The change of shift press conference with the off-going Flight Director with Harold Draughon has been cancelled. That change of shift press conference had been set at 4:30. Draughon was presiding over some of the activities here in Mission Control at the same time that Flight Director John Cox, was working the EVA, and we have already had the John Cox, change of shift press conference a couple of hours ago, and do not feel the need to repeat a change of shift press conference for that same period of time. All systems on board the Orbiter are quiet. The crew is about the start the scheduled sleep period, and there are no major problems or activities of special interest to discuss. To repeat the change of shift press conference with Flight Director Harold Draughon, originally scheduled for approximately 4:30 p.m. central time, has been cancelled. This is Mission Control Houston.

CAPCOM Challenger, Houston, with you through Guam for 5 minutes.

SPACECRAFT Roger Houston, loud and clear. The vernier firing test is completed, and just a second and I'll give you the time to look for. Mary, hot fire was completed at 7:46, 5 seconds pitch up, with verniers and excel.

CAPCOM Roger, we copy that, and Vance, your temperatures look really good and you won't have any trouble with those tonight.

SPACECRAFT Good, glad to hear did some good.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead.

CAPCOM Roger, we'll be calling you when we come AOS TDRS, at that time were going to update your state vector, and we should have a state vector that will hold good at through rev 108 at that time. And we will also get back to you about your supply water, dump valve enable nozzle heater procedures and we might have a slight change in those from what we read up to you earlier. Otherwise that should be close of business for us today, unless you have something else you'd like us to do.

SPACECRAFT No, I don't think so, okay we'll stand by for a, we won't do anything with the supply water dump until we hear from you and we hope we don't keep you working longer hours tonight like we did last night.

CAPCOM Roger that. Challenger, Houston, we're coming on to LOS, we'll talk to you through TDRS at 8+24.
SPACECRAFT  Okay, see you there.

PAO  Mission Control Houston, 6 days 8 hours 5 minutes, mission elapsed time. We have loss of signal through the Guam station. We'll reacquire through TDRS in 18 minutes. Crew is still going through some last minute items, finishing up there supper, little slower getting to bed tonight. Things are otherwise very quiet on board the Challenger. As a reminder the change of shift press conference for the off-going Flight Director Harold Draughon, originally scheduled for 4:30 pm today has been cancelled. There was a change of shift press conference with Flight Director John Cox, only a few hours ago, that briefing covered the EVA the primary activity for today and encompassed the time period for most of the shift. And we don't feel that it's necessary to cover the additional time since that briefing, which has been primarily been presleep activity. Repeating change of shift press conference with the off-going Flight Director Harold Draughon originally scheduled for 4:30 pm central time has been cancelled. This is Mission Control Houston.

PAO  Mission Control Houston 6 days 8 hours 25 minutes, mission elapsed time. They have acquisition through TDRS, we expect perhaps just a few brief words with the crew on the water dump line temperatures, updating a state vector and then we'll probably tuck them in for the night. Mission Control Houston.

CAPCOM  Challenger Houston, with you through TDRS.

END OF TAPE
CAPCOM Challenger, Houston with you through TDRS.

CAPCOM Challenger, Houston with you through TDRS.

CAPCOM Challenger, Houston back with you through TDRS. Challenger, Houston back with you through TDRS. Challenger, Houston back with you through TDRS. Challenger, Houston with you through TDRS.

PAO Mission Control. 6 days, 8 hours, 35 minutes. Seem to have a temporary communications linkup problem that's on the ground here in the Control Center as we do have lock with the TDRS. Should be getting that squared away here to give the crew the last message or two for the night.

CAPCOM Challenger, Houston back with you through TDRS. Challenger, Houston back with you through TDRS.

SPACECRAFT Roger, Houston, and we're sitting down to debrief right now and to give ourselves a hand around microphone we've disconnected the teleprinter for the time that we'll be briefing. So that's just for your information.

CAPCOM Roger we copy that, Vance, and we have sent a vector up to you to keep you going through the night and it should be good to rev 108. Also --

SPACECRAFT Okay, good to rev 108 and Hoot's here's standing by for instructions on the water dump.

CAPCOM Roger, what we'd like to do on that is keep that dump nozzle heater on. It's up to 50. We think it may be sublimating out and correcting the problem. However, we do not want that to interfere in anyway with the amount of sleep he gets so if he could give us a call we'll have him turn the nozzle heater off before he's going to sleep.

SPACECRAFT Okay Mary, understand. We're going to go ahead and leave that guy turned on and then the other part of that was give you a call before we go to sleep so you can take one last look at it.

CAPCOM Well, we wanted to make sure that it goes off before you go to sleep so that's why we'd sort of like a call.

SPACECRAFT Okay, all right. Understood you that time. We'll turn it off before we go to sleep and give you a call when we do that.

CAPCOM Thanks a lot.
SPACECRAFT And Houston, Challenger. Give us one more check on the speaker if you would please.

CAPCOM Challenger, Houston. How do you read?

SPACECRAFT Okay just fine, Mary. We were trying to set the volume, is why we asked for another check.

CAPCOM Roger, got you, thanks.

PAO Mission Control Houston. Crew of the Challenger as they pass over the South Atlantic Ocean on rev 103 are now debriefing today's EVA, taping comments and thoughts on the activity outside the payload bay this morning while here in the Mission Control Center the planning team is taking over from orbit 2, handover complete. We're in sleep configuration on the Orbiter. Flight deck CRTs, 3 of the 4 are off indicating the crew is about ready to wrap up their night and a reminder we have cancelled the 4:30 pm Harold Draughon Change-of-Shift Briefing and if we follow our usual course of activity we will probably cancel the Larry Bourgeois briefing this evening at 12:30 am unless something exciting happens on the planning shift. Therefore, it's probable that the next Change-of-Shift Briefing will be the 8:30 am Randy Stone Press Conference tomorrow morning. At mission elapsed time 6 days, 8 hours, 58 minutes this is Mission Control Houston.

END OF TAPE
Mission Elapsed Time 6 days, 8 hours, 58 minutes, this is Mission Control Houston.

Challenger Houston going LOS TDRS, see you at Guam at 3 4.

Mission Control Houston, that last communication from CAPCOM Guy Gardner, probably did not reach the crew INCO reports we were right on the verge of losing TDRS and CAPCOM reported a red light on his console indicating that it was doubtful that the call went up anyway. Although the crew is officially in a sleep period, they are still up reviewing the days event, and they are conducting a debriefing among themselves on today's EVA. Mission Elapsed Time 6 days, 9 hours, 16 minutes, this is Mission Control Houston.

This is Houston Comtec testing 1, 2, 3, 4, 5, 5, 4, 3, 2, 1. Houston Comtec testing 1, 2, 3, 4, 5, 5, 4, 3, 2, 1. Houston Comtec testing 1, 2, 3, 4, 5, 5, 4, 3, 2, 1. This is Houston Comtec testing, 1, 2, 3, 4, 5, 5, 4, 3, 2, 1.

Mission Control Houston, another reminder we have cancelled the 4:30 pm Harold Draughon Change of Shift Briefing. Next scheduled briefing would be at 12:30 am tonight with Larry Bourgeois. It's probable unless there is some excitement on the planning shift, that we will cancel that too. Meaning that the next Change of Shift Briefing would be tomorrow morning at 8:30 am with Randy Stone. At Mission Elapsed Time at 6 days, 9 hours, 25 minutes, this is Mission Control Houston.

Challenger, Houston with you at Guam for 5 minutes. Challenger Houston with you at Guam for 4 minutes.

Hello Houston we got you loud and clear through Guam.

You too Hoot. Challenger Houston going LOS here, we'll be up at TDRS at 10 hours.

Okay Guy, we'll see you on TDRS. Looks like our dump nozzle temperatures are starting to creep up a little bit.

Roger copy, Hoot.

Mission Control Houston, we're AOS TDRS east processing low bit rate data. Mission Elapsed Time 6 days, 10 hours.

Challenger Houston with you on TDRS.

Okay Guy, loud and clear.
Mission Control Houston, Challenger now approaching the west coast of South America. Currently in a 146 by 157 nautical orbit. At this equator crossing to begin orbit 104, we'll have traveled thus far in this mission approximately 2,300,000 nautical miles. Propulsion officer who updated the Flight Director at shift handover about an hour ago, reiterated that this morning about 3 hours after selection of verniers, earlier this morning when the crew had awakened, the vernier driver that had given them some problems yesterday, at shift handover, did fail. They've gone to primaries and there in what they call the verniers fail timeline, which lays out attitude control --
Earlier this morning when the crew had awakened, the vernier driver that had given them some problem yesterday at shift handover did fail. They have gone to primaries and they're in with what they call the verniers fail timeline which lays out attitude control firings on the orbiter using primary jets rather than the verniers on the aft vent. And the propulsion officer has reported that they still have plenty of gas, even if they just use primaries, which are slightly less efficient than the verniers. At Mission Elapsed Time, 6 days 10 hours 16 minutes, this is Mission Control Houston.

SPACERFRAUGHT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead.

SPACERFRAUGHT Hey, Guy. We just finished our debriefing of EVA 2 ICOM B. It starts around 0850 ends at about 1025. And once again (garble) if you could drop copies off in our office so that we could read them when we get back, to use during debriefing, it would help, we'd really appreciate it.

CAPCOM Roger, understand you want copies dropped off in the office, Vance.

SPACERFRAUGHT Right, one for each of the five crewmen, if you don't mind.

CAPCOM Roger, we copy that Vance and has the -- have you turned off the supply dump valve enable nozzle heater?

SPACERFRAUGHT No, Guy, I have not turned that off yet, did you want to do one more attempt to the dump or want to just let it continue to sublimate, or what?

CAPCOM We would like to let it sublimate overnight.

SPACERFRAUGHT Okay, copy, you want to let it sublimate, so I, I can turn the dump heater off anytime you want.

CAPCOM Roger, we may as well go ahead and do it now and that's all we'll have and let you guys get to sleep.

SPACERFRAUGHT Okay, sounds good, we'll go ahead and hit her down there.

CAPCOM Okay, see you in the morning, we'll have some extra special music for you then.

SPACERFRAUGHT We were hoping you would. Heck, that's what you've had for us all week.

CAPCOM This is really special.
SPACECRAFT    All right, can't wait to wake up.

CAPCOM    Mission Control Houston. Challenger now roughly at the equator, beginning orbit 104. Commander Vance Brand reporting that the crew is finished their roughly 2 hour debrief of today's EVA. They committed that to tape and called down some time numbers for that so that we can pick it out of the telemetry tonight and make transcripts of it for review by flight management and some members of the astronaut office. And Vance Brand asked that we dump some copies off in his office so that he and other members of the crew can read them when they get back. The other item on that transmission was concerning a balky waste water dump procedure. They've been having some trouble getting that to commit to a dump and flight director Larry Bourgeois asked that they just go ahead and shut the heater off and let the water sublimate over the night and then will try the dump again in the morning.

CAPCOM    ...teleprinter hooked up so we can get our stuff up tonight.

PAO    At Mission Elapsed Time, 6 days 10 hours 31 minutes, this is Mission Control Houston.

SPACECRAFT    That's affirmative, Guy. Teleprinter is hooked up just like we did last night.

CAPCOM    Roger, thank you.

END OF TAPE
PAO Mission Control Houston, the Challenger now on orbit 104 over the South Atlantic, over the South Pacific approaching the coast of South America. The crew is asleep, the controllers here on the planning shift are looking ahead to entry day and the things that have to be done tomorrow, our last full day in space to bring us home on Saturday, if we come in at a nominal time. And we're also looking at a playback of today's EVA here in the control center. A reminder that there will be a crew press conference tomorrow, an inflight press conference, with the 41-B crew which will be conducted from 5:51 a.m. to 6:21 a.m. central standard time and will originate from the Johnson Space Center and from low Earth orbit. The conference is going to be held on this end in room 135, building 2, at the Johnson Space Center, and all media representatives who wish to participate in the conference must be at that location 10 minutes before the news conference begins or at about 5:40 a.m. The traditional format for news conferences will be used, allowing questions from all media recognized by the moderator. The following ground rules will apply during the news conference, 1) participating media must be in place 10 minutes before the start of the conference, 2) single questions for all 5 crewmembers will not be allowed. One question may be directed to two crewmembers with common assignments, i.e., to the commander and pilot, to the 2 EVA astronauts, etc., 3) media participants will be allowed only one followup question with each question asked and 4) questions should be brief, to the point and we ask that there be no editorializing in the question itself. At Mission Elapsed Time, 6 days, 11 hours 49 minutes, this is Mission Control Houston.

PAO Mission Control, Houston. Challenger on orbit 105 over the middle East. We just passed through TDRS coverage and we're in a loss of signal area now. The crew has about 3 and a half hours left in their sleep period and here in Mission Control they're putting together the flight execute package for the morning. And all quiet both here and on the spacecraft. At Mission Elapsed Time, 6 days 12 hours 28 minutes, this is Mission Control Houston.

END OF TAPE
PAO Mission Control, Houston, all quiet aboard the Challenger on orbit 106 and down here in the Mission Control Center. There's about 2 hours and 17 minutes left in the crew's sleep period. The Challenger currently in orbit 157 by 146, right now at an altitude of 152 nautical miles. We would remind you again about the inflight press conference in the morning which begins at 5:51 a.m. and will run to 6:21 a.m. central standard time, originating from room 135, building 2, at the Johnson Space Center and of course, from the Orbiter Challenger currently in low earth orbit. All media representatives who wish to participate must be at JSC. Traditional format will be used during the press conference allowing questions from all media recognized by the moderator and the following ground rules will apply. Participating media must be in place 10 minutes before the start of the conference or by about 5:40 a.m. Single questions for all 5 crewmembers will not be allowed. One question may be directed to 2 crewmembers with common assignments; i.e., the Commander and the Pilot or the EVA and the Mission Specialist, etc. Media participants will be allowed only one followup question with each question asked. And questions should be brief and to the point. We also, given the somewhat quiet planning period, wonder if there is indeed a need to hold a 12:30 a.m. Change of Shift briefing and are going to begin our process of asking that anyone who thinks we should have one, please call the Johnson Space Center Newsroom or the Kennedy Space Center Newsroom. Otherwise, it's likely we will cancel that later on this evening. At mission elapsed time 6 days, 13 hours, 44 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, all still quiet here on the sleep shift for the crew Challenger and in Mission Control for the planning team. We're on one of those long TDRS to TDRS loss of signal periods where we don't pass through any other ground tracking stations and we will have acquisition through the satellite in about 20 minutes. And about an hour and a half remaining in the crew's sleep period. At mission elapsed time, 6 days, 14 hours, 26 minutes, this is Mission Control, Houston.

END OF TAPE
PAO Mission Control, Houston. Cruising 154. 7 n.mi. over the mid-Atlantic, Challenger has entered the range of the Dakar station, and we are processing Dakar data. 41 min left in the crew's sleep shift. Mission Elapsed Time, 6 days, 15 hr, 18 min, Mission Control, Houston.

PAO Mission Control, Houston. Now on orbit 107 over the Indian Ocean. About 12 min left in the crew's sleep period, but we don't expect a wakeup call to go to the crew until acquisition of signal through TDRS in about 33 min. Mission Elapsed Time, 6 days, 15 hr, 48 min, this is Mission Control, Houston.

PAO Mission Control, Houston. Again, we are planning to cancel the 12:30 a.m. Larry Bourgeois change-of-shift press conference unless otherwise requested by the news media. And we'll give you another 30 or 40 min to phone in those requests, if you would, to either the KSC Newscenter or the JSC newscenter. This is Mission Control, Houston.

PAO Mission Control, Houston. EECOM reports the crew is awake, and we are, right now, going through the Orroral Tracking Station. We don't, however, anticipate any crew wakeup call til AOS TDRS in about 16 min. At 6 days, 16 hr, 5 min, this is Mission Control, Houston.

PAO Mission Control, Houston, standing by for wakeup call through TDRS.

END OF TAPE
PAO Mission Control, Houston, standing by for wake-up call through TDRS.

(wake-up call)

CAPCOM Good morning Challenger.

SPACECRAFT Good morning. Thank you for that beautiful song.

CAPCOM You're quite welcome, that's from all your Air Force CAPCOM's. And Challenger, Houston, we didn't get any return link on the teleprinter. We wanted to check to make sure you got your teleprinter messages this morning.

SPACECRAFT Yes, John, we faked you out on that one I'm afraid, it should be hooked up okay now.

CAPCOM Roger, understand and did, did you get the messages?

SPACECRAFT No, we didn't. Apparently the configuration wasn't completely hooked up and we think it is now though.

CAPCOM Okay, we'll get them up to you here in 10 minutes at MILA.

SPACECRAFT Okay.

CAPCOM And, Vance, there's nothing important happening before that time that you can get them and review them. Nothing pressing.

SPACECRAFT Okay, very good and we, we are into the rolling align now.

CAPCOM Roger, we see that.

SPACECRAFT Gee, Guy, you were right. Gee Guy, you were right, that wake-up was a special experience this morning.

CAPCOM You bet.

PAO That wake-up music, a live rendition of the Air Force song.

SPACECRAFT (garble) you bet.

PAO Mission Control Houston, there had been some trouble earlier in the morning sending up the morning's daily MAL, the flight execute package and other teleprinter messages. It turns out that the machine was not set on receive onboard the spacecraft so they're going to attempt to send it again through
Bermuda. At Mission Elapsed Time, 6 days 16 hours 32 minutes, this is Mission Control, Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead, Hoot.

SPACECRAFT Guy, do we have any special plans for trying a supply water dump this morning?

CAPCOM Roger, that's affirmative, Hoot. We're going to try that, if you want, it's in the teleprinter message but you can go ahead and take the supply water dump valve enable nozzle heater and turn it on and then after that gets heated up, we'll go with the dump.

SPACECRAFT Okay, I've got that on.

CAPCOM Roger.

SPACECRAFT Guy, what kind of temperature do we want to wait for before we, before we start that dump?

CAPCOM Stand by, Hoot. We want to start it at 300 degrees.

SPACECRAFT Okay, 300 degrees.

CAPCOM And Challenger, Hooter, we don't want you to dump until we get a chance to look at it, and we'll give you the go on that.

SPACECRAFT Okay, will do, Guy. Hey, Guy, it looks like the temperatures are coming up fairly nicely on that nozzle, it may have all sublimated out.

CAPCOM Roger, that sounds good, we just got a few switches here...

END OF TAPE
STSC-41-B AIR/GROUND TRANSCRIPT t399j 041:05:34 2/9/84 PAGE 1

SPACECRAFT Okay, will do, Guy. And Guy, it looks like the temperatures are coming up fairly nicely on that nozzle. It may have all sublimated out.

CAPCOM Roger, that sounds good. I just got a few switches here that are coming up in the postsleep on the message if you want, I can give them to you. There's one over on the ECLS panel and one on -- and the cryo heaters.

SPACECRAFT I'm right next to ECLS, why don't you go ahead, Guy.

CAPCOM Okay, Vance, like the O2/N2 controller #2 to close.

SPACECRAFT Okay, it's closed.

CAPCOM Thank you and on the cryo, we'd like the O2 and H2 for tanks 3 and 4 all -- heaters, A & B, all of those heaters to off.

SPACECRAFT Okay, taking all the tank 3 and tank 4 heaters to off.

CAPCOM Roger and since the O2 in tanks 1 and 2 is down now, you can take the bravo heaters on O2, tank 1 and 2, both of those to off.

SPACECRAFT Okay, taking the O2 tank heaters and tanks 1 and 2, the bravo heaters, to off.

CAPCOM Roger, that's it and the only other presleep we had for you was to load a PCMMU format. They'll be a 103 and 161.

SPACECRAFT Okay, we'll get it.

SPACECRAFT Okay, Guy, the ...

CAPCOM And Challenger, Houston, you're last comment was cut out, we just handed over to MILA.

SPACECRAFT Guy the PCCMMU'S have been PCMMUed.

CAPCOM Roger, thank you. And one note for you and a further note on the RCS. We'd like you to go ahead and use the manifold 3 jets. Reselect the jets and then override the manifold status to open.

SPACECRAFT And turn the driver back on, of course.

CAPCOM Roger that. And all we'll need on the IMU align are the star IDs and the angle error.
PAO      Mission Control, Houston. We're uplinking the
teleprinter message to the crew of Challenger through Bermuda and
we have cancelled the 12:30 a.m. Change of Shift briefing with
Larry Bourgeois, off-going flight director. The next opportunity
to discuss space in room 135 will occur at 5:51 a.m., Friday
morning, the in-flight press conference with the crew of
Challenger. We would remind you that all participants on the
ground need to be at the building, building A, room 135, no later
than 5:40 a.m. Mission elapsed time, 6 days, 16 hours, 47
minutes, this is Mission Control, Houston.

CAPCOM    Challenger, Houston, back with you on TDRS and you
should have all your teleprinter messages now.

SPACECRAFT Okay, Guy, thanks. I think we're looking for them
now.

CAPCOM    Roger, Vance, and at your convenience, we need the
star ID numbers and the angle error and would like the star
trackers to track.

SPACECRAFT Okay, stand by. Houston, Challenger.

CAPCOM    Roger, go ahead, Vance.

SPACECRAFT Stars were 13 and 38, angle error .01, angle
between the two 85.2, parked 6 days, 16 hours, 32:15. Would you
like the matrix of errors?

CAPCOM    That's affirmative, Vance, please.

SPACECRAFT Okay, starting with X and going across, minus .04,
minus .12, minus .03. Y, plus .06, plus .06, minus .10. Z,
minus .18, minus .01, plus .08

CAPCOM    Roger, thank you, Vance.

SPACECRAFT You bet.

PAO      Mission Control, Houston. We have cancelled the
12:30 a.m. Change of Shift press conference with ...

END OF TAPE
SPACECRAFT  (Garble) on 86B, you can close those two. Bob, would you (garble) circuit breakers again, please. too.

SPACECRAFT  Okay, Bruce. I'm on my way down there.

SPACECRAFT  Hey, Jerry.

CAPCOM  Go ahead.

SPACECRAFT  We could call the Oilers and tell them I want to try out as the place kicker next year. I can kick with either leg. I think I can kick a football about 60 yds by now.

CAPCOM  Copy that, Bob. They could use you.

CAPCOM  Challenger, Houston. I've got several notes whenever somebody's ready to copy them.

SPACECRAFT  Okay, ready to copy.

CAPCOM  Okay, Vance. First of all, we want to do the 10 2 cabin maintenance with N2 only, prior to the repress. Secondly, we need some cryo heater reconfigurations. Panel All, 02 tank 4 heater bravo --

END OF TAPE
CAPCOM      Okay, Vance first of all we want to do the 10.2
cabin maintenance with N2 only prior to the repress. Secondly we
need some cryo heater reconfigurations, panel All 02 tank 4
heater bravo to off, RL 02 tank heaters A to auto, H2 tank 3
heaters A and B to auto, over.

SPACECRAFT  Okay, Jerry, I got the ones on RL, I got the 02
tank 3 heater A auto and the HP tank 3 heaters both of them to
auto, what was the one on All, again.

CAPCOM      Okay, Hoot, that's 02 tank 4, bravo to off.

SPACECRAFT  02 tank 4 bravo going off.

SPACECRAFT  Jerry, we understand you'd like to do the 10.2
cabin maintenance into only the fourth airlock repress, we can
probably do that right away.

CAPCOM      Okay, Vance, and for Hooter on All, that was 02,
tank heater B to off.

SPACECRAFT  Okay, I'll change that Jerry, 02 tank B going off.

SPACECRAFT  Put out your lights, Bruce, its wiping out my
meter.

SPACECRAFT  I see the shutter working.

SPACECRAFT  Yes, it's working, I can feel it.

SPACECRAFT  Okay, I've gotten latched into the MMU, I'm going
to come out by pulling just one latch.

SPACECRAFT  Okay, standard checkout, huh.

SPACECRAFT  Yes, just to verify you can do it. Okay, I just
pulled the right latch and got out...

SPACECRAFT  When you did that you raised the right arm to
(garble) -- to flight position.

SPACECRAFT  This one was from my thrusting with my leg.

SPACECRAFT  Yes, doesn't look like (garble)

SPACECRAFT  (garble)

CAPCOM      Challenger, Houston, be advised the mass spec
shutter shield is not working at this time, we believe it might
be too cold, we'll be commanding it off from the ground.

SPACECRAFT  Hey, Bruce have you got your lap belt on the
outside of your tether, is that where you want it?

SPACECRAFT We copy Jerry.

SPACECRAFT This tether?

SPACECRAFT Yes, that tether.

CAPCOM Challenger, Houston, for Ron.

SPACECRAFT Okay, Jerry.

CAPCOM Okay, Ron concerning Cinema 360 shots in the cargo bay, you're go for whatever type of MMU ops proximity work you can get in, recommend using 18 frames per second and you can read the proper exposure setting from the Earth ops chart. Be advised you have approximately 10 minutes of film remaining.

SPACECRAFT Yes, but I want you to hurry.

SPACECRAFT What?

SPACECRAFT Yes, but I want you to hurry.

SPACECRAFT Why?

SPACECRAFT So I can try.

SPACECRAFT Okay, we'll get it.

SPACECRAFT Okay, Jerry, I copied that except for the last portion about 10 minutes.

CAPCOM Okay, Ron, the estimate is you have 10 minutes of film remaining.

SPACECRAFT Okay, thank you.

SPACECRAFT (garble) put my foot up, my foot's asleep.

CAPCOM Challenger, Houston, we're 30 seconds to LOS, Bob and Bruce could you give us the sublimater pressure readings when you had your messages?

SPACECRAFT 2.2 on mine, Jerry.

SPACECRAFT I had 4.3 going up to 4.4.

CAPCOM Okay, copy, hopefully we'll get you quickly on TDRS this time, 20 seconds to LOS.
SPACECRAFT  See you quickly, hopefully.

PAO        This is Mission Control Houston. We've had LOS through Hawaii and we'll pick up the TDRS signal and downlink TV in just a few moments. The sublimater pressure messages, Vance Brand reported at AOS Hawaii, a couple of caution and warning alarms triggered by high pressure readings and the two EMU's.

SPACECRAFT  (garble)

PAO        And it's believed to be just a transient suit problem. We are at AOS TDRS, we'll have voice momentarily and...

SPACECRAFT  (garble)

END OF TAPE
PAO And it's believed to be just transient suit problem. We are at AOS TDRS, we'll have voice momentarily and followed soon by video.

SPACECRAFT (Garble) extremely difficult. I took it up 5 notches which is about 5/8 of an inch based on yesterday's operation. And it's apparent that the sizing between the left port and starboard MMUs is different. This wasn't supposed to be the case.

PAO This is Mission Control, it's 5 days, 22 hours, 47 minutes.

SPACECRAFT The starboard's no problem at all, is that right?

SPACECRAFT No, the starboard was very difficult. The right-hand left belt on the starboard MMU is very difficult.

PAO EVA crew is about 10 minutes behind their timeline.

CAPCOM (garble) we would like Ku to command.

SPACECRAFT Challenger, go ahead.

CAPCOM Roger, Challenger, we would like Ku to command, please, so we can get TV.

CAPCOM Challenger, Houston.

SPACECRAFT Yes, Houston.

CAPCOM Roger, did you copy? We would like Ku to command, please.

SPACECRAFT U to command.

CAPCOM And also Challenger, be advised, I lied to you with a little bit of help from Payloads. We have got mass spec operating so you should anticipate a cycling every 20 minutes.

SPACECRAFT Okay John, we copy that, thanks.

CAPCOM Challenger, Houston, for Bob.

SPACECRAFT Go ahead, Jerry.

CAPCOM Okay Bob, to try to stay up on the timeline, as soon as Bruce gets the t-pad installed, we would like you to go to the port MMU and start prepping it.

SPACECRAFT Yes sir, that's what I planned.
This picture shows Bruce McCandless backed into the MMU. He's positioning the fiber optic alarm lights, caution and warning lights. They'll be in his field of view. As the control arm's extended, the end is now freed. McCandless will now put the MMU through a flight --

Challenger, Houston, for Bruce. Bruce, you may consider cycling your TV again to see if you can get it to work.

And they'll be a button on the forehead of it.

I just did a couple of minutes ago.

Okay, we're hoping you get up in the sunshine a little bit, it may warm up and start working.

Listen you come out, what you do is you check back a little bit in the bay?

Yes.

Because you're too close to get a good picture here.

The thrusters seem to be working, Bruce.

Yes, they do. Yes, we can feel them (garble).

Challenger, Houston, we'd like a switch on A7. TV control to command, please.

McCandless putting the MMU through checkout procedures verifying the thruster of firing the gyro power. He will now move up to a position facing the aft crew station windows and put the MMU through a 3-axis rotation exercise.

Challenger, Houston, for Vance, referencing flight sub 12-16.

That was page 12-16?

That's affirm, Vance, box 28.

Okay, go ahead.

Roger, Vance, recommending there, a third of the way down the box using DAP B4 since we've lost verniers. That's bravo 4 and loaded into the A DAP.

Okay, copy that, block 28, about a third of the way down.

END OF TAPE
CAPCOM    down the box using DAP B4 since we have lost verniers, that's bravo 4 and load it into the A DAP.

SPACECRAFT Okay, copy that, block 28, about a third of the way down, change to use DAP B4 into A DAP due to verniers.

CAPCOM    Roger, that.

SPACECRAFT (garble) checks out.

SPACECRAFT Okay, back up A then A and satellite stabilization.

SPACECRAFT Can you fly up, Bruce?

SPACECRAFT Up in the bay?

SPACECRAFT Yes, you're up against the black sky.

SPACECRAFT How's that?

SPACECRAFT (garble) up in the bay.

SPACECRAFT (garble) back up (garble)

SPACECRAFT Hey, I can see cities passing by out there.

SPACECRAFT Very good.

SPACECRAFT It looks as if the cities are very, very close constellations.

SPACECRAFT We should be coming up on Houston pretty soon.

SPACECRAFT Really, you're kidding.

SPACECRAFT No, we're on our way towards Houston.

SPACECRAFT Bob, when you go over, why don't you shine your flashlight at them.

PAO Mission Control Houston, the Orbiter will be visible over the city for about 5 minutes as it makes its pass at...

SPACECRAFT That is really pretty, that is really neat!

PAO At a position about 54 degrees above the horizon.

SPACECRAFT That looks real smooth, Bruce.

SPACECRAFT It is.
It's just like you're on that simulator up there in Denver.

Hey, I can see stars out here.

Turn around and look at the towns.

Once again the Orbiter Challenger will be visible in the Houston area in just a few moments...

There's a variable snowstorm out here. Of course, snow is falling up relative to us.

It will be visible for about 5 minutes over the southern horizon.

It may be the water dump.

And an elevation of...

(garble) out there, most of those things that you see in a water dump.

At an elevation of 54 degrees.

Can't see it yet.

Good morning Houston.

Good morning Bruce, how you doing. Look like you're having fun, looks like some victory rolls up there this morning.

Yes, it really is performing nicely. Guess I got to get down to work and do the dockings, though.

Okay, copy that, we've got an additional thing we'd like you to look at sometime this morning Bruce, when you're flying, we'd like you to, to attitude ON primary mode, translations in X, Y and Z and see if you get the jerky motion that you reported yesterday in all three axes.

Jerry, I was just doing that and the answer is basically yes. And I think it is the modulation lever.

Okay, copy, basically yes in all three axes and have you tried it when the attitude of off.

Yes, with it off, it's nice and smooth.

Okay, copy that, thank you.
SPACECRAFT (garble) that's the same as yesterday's
SPACECRAFT Hopefully.
SPACECRAFT You look surprised at winning photography here.
SPACECRAFT (garble) expect it will be.
SPACECRAFT What do you think about this, you need me to come over and give you a hand?
SPACECRAFT No, it went on pretty easily yesterday.
SPACECRAFT You got that secondary T-pad sticking down today.
SPACECRAFT Yes, well I may need some help.
SPACECRAFT Well hang loose here and just give me a holler if you want.
SPACECRAFT (garble) get overly involved and stuff.
SPACECRAFT Jerry, you'll see a shot in a minute of the ground going by along the Gulf Coast, hopefully, clouds (garble)
CAPCOM Roger, I got a little bit wet coming into work today.
SPACECRAFT Oh well there goes my Pulitzer prize.
END OF TAPE
SPACECRAFT Jerry, you see a shot in a minute of the ground going by along the gulf coast, mostly clouds you can see.

CAPCOM Roger, I got a little bit wet coming into work today.

SPACECRAFT (garble) well, there goes my Pulitzer Prize.

SPACECRAFT (garble) give prizes for rear end views or something?

SPACECRAFT Well, I just came out of foot restraints, just trying to bend around to get a picture of the (garble) passing by.

CAPCOM Challenger, Houston, we see your flight deck camera approaching a temp limit. You may want to cycle it off for a while.

SPACECRAFT Okay, we'll turn it off.

PAO McCandless now fixing the trunion pin attachment device to the front portion of his MMU and it's a device that would dock with the trunion pin on the SPAS and during mission 41-C, the Solar Maximum Satellite.

SPACECRAFT You know there's no air out here when you see a little tiny ice crystal, (garble) shaped like a rod come by spearing at about 90 RPM and not slowing down.

SPACECRAFT And Bruce, after you get that t-pad installed before you start your dockings, would you give us your GN2 pressure?

SPACECRAFT Yes sir, 2200 on A and 2150 on B.

SPACECRAFT What are we passing now, Vance?

SPACECRAFT We came close to Houston a few minutes ago, went south of Florida as near as we can tell and we're out in the Carribean someplace now.

SPACECRAFT Okay.

PAO At the top of the screen, Bruce McCandless fixing the trunion pin attachment device, at the bottom of the screen, Bob Stewart --

SPACECRAFT As a matter of fact, we have to double check on it cause it's a little cloudy but we think we see Cuba. You may see it directly out there. We just passed over it.
STET 41-B AIR/GROUND TRANSCRIPT t339j 040:12:00 2/9/84 PAGE 2

SPACECRAFT Yes, I see it and now (garble) Dominican Republic.

SPACECRAFT Straight down.

SPACECRAFT Yes.

SPACECRAFT It sure is awful pretty.

SPACECRAFT The scene sure is.

PAO At the bottom left portion of the screen, astronaut Bob Stewart engresses and begins checkout.

SPACECRAFT (garble) power off, have a considerable CC Ops at—— Not as bad as I thought it would be. With a -Z, with a -X, I get a fair amount of plus roll, excuse me, -Y, I get (garble) plus roll. +Z, (garble) I'm going to go on over by the SESA.

CAPCOM Challenger, Houston, time is slipping away here. We'd like Bob to start the repress of the port MMU and Bruce to stay to timeline. We see about another 25 minutes for you before you have to be back in the FSS.

SPACECRAFT Okay.

SPACECRAFT Bruce, Bob, we're an hour and 43 minutes into the EVA.

SPACECRAFT Okay.

SPACECRAFT (garble) curve on translation is quite steep here. It's a lot easier to translate today.

CAPCOM Roger, that sounds good.

END OF TAPE
(Carble) translation is quite steep here, it's a lot easier to translate today.

Roger, that sounds good.

(Charble) okay, that's one on the SESA.

McCandless doing a soft --

(Charble) if you could put this thing in about a 1 degree per second yaw I could have a moving target back here.

You mean the whole spacecraft, don't you.

Yes, sure. No, I'm not serious.

Know you wouldn't want an OMS burn.

Okay, Vance, I've retrieved the battery bag from the airlock.

Okay.

Okay, Jerry, I'm going to give the cameras over to INCO and I'm going to go into the movie business now.

Are you getting anything from the helmet mounted TV at all?

Okay, Ron we copy that.

Go try it again.

And Bruce after the SESA trunnion pin dockings we have you over at the SPAS doing the same thing.

That is where I'm headed.

And Challenger, Houston, Vance, did we copy a request for an OMS burn pad?

You copied a request by me to not give them a OMS burn pad.

We just didn't want, want him to forget that he had a lot of friends inside.

Roger that, we always got to keep everybody in their place.

Here we go, I'll make this one a hard docking.
SPACECRAFT  Okay.

SPACECRAFT  (Garble) power is off in A, (garble) is off. I've got tethers all over the place here.

PAO  This is Mission Control Houston, the South Atlantic Ocean rolling by underneath the Orbiter as Bruce McCandless shoots some approaches to the Shuttle pallet satellite.

SPACECRAFT  Yeah, I'm looking at it, I'm just barely on the GO/NO GO line, I'm going to back up here.

SPACECRAFT  Houston, Challenger, what state do you see over SPAS TV?

CAPCOM  Stand by, Ron, we'll look.

SPACECRAFT  Okay, Vance, I'm fixing to put the battery into the port MMU. You have any steps (garble) for me or anything?

SPACECRAFT  Yes, stand by one.

SPACECRAFT  And just to (garble) of things.

SPACECRAFT  Okay, GN2 servicing, step 1, MMU --

END OF TAPE
Okay, GN2 servicing step 1, MMU GN2 supply isol valve 2 to open.

All right, just a second, I'm still working the battery.

Okay.

Okay back here on this trunion pin, I still (garble) with the go/no go indicator a good quarter of an inch into the go region. And then by the time I get to expanding the bolt, it's crept back up right about to the line between go and no go. And it seems like I'm tending to drift off the trunion pin.

Challenger, Houston, INCO's going to take over commanding of your cameras in the bay and Ron, we don't see the SPAS camera on.

Okay Jerry, copy that and I gave the cameras to INCO some time ago. Did you copy that?

Yes sir, we just wanted to verify we were picking them up, thank you.

Roger, you have them.

Okay Vance, on the (garble) MMU GN2 supply isol valve, 3 of them to open.

Roger, they're open.

There's a charge vent pressure (garble) line pressure zero. Got to find a foot restraint again here. Okay.

This photo from the elbow camera on the RMS showing Bruce McCandless docked to the trunion pin on the German Shuttle Pallet Satellite. He's performing a hard docking where the trunion pin attachment device clamps down onto the satellite fixture and gives him a secure lock on it.

Okay, I believe I've completed a hard docking here. I'm going to try to pull myself off with the MMU. Okay, if you're watching, I'm - on one of the TV cameras, I'm going to put in a plus roll and (garble). There's essentially no motion between the t-pad itself and the SPAS trunion pin. All the motion is occurring between the control box and the grapple fixture. Put in a minus roll, that's 4 thrusters in plus and minus roll in (garble). By rocking it I can get the thumb motion, not much, now I'm going to give it -X. You can see the blanket on the MEB blowing, but I'm not going anywhere. About a -2. You can see that I'm riding up but I'm held. It took 4
thrusters, of course, and a +Y for example. And the little roll
pads are sliding back and forth a little in plus Y but everything
is holding. That's with the block diamond right at the go/no go
line which as I said before when I initially docked and also when
I tightened it up with the, and recocking the jaws and firing
+X. I was a good quarter of an inch into the go position. Okay,
I'm going to disengage here so I can do a few more soft dockings.

PAO                   Those thrusters firings demonstrating a good secure
look on the trunion pin.

CAPCOM              And Bruce, we've got a real good picture of all
that activity you've been conducting there off of the elbow
camera. Ten more minutes till we need you back in the FSS.

SPACECRAFT  Oh, okay.

END OF TAPE
Those thruster firings demonstrating a good secure lock on the trunnion pin.

Bruce, we got a real good picture of all that activity you've been conducting there off of the elbow camera, 10 more minutes until we need you back in the FSS.

Pardon me.

Roger, Bruce, about 10 more minutes before we need you back in the FSS.

Okay, if you're satisfied with the hard dock operations, I'm going to do some more soft docks here, I still got 16 hundred psi on the A side and 14 hundred on the B side.

Okay, I think these isol valves are closed here. Bruce, can I turn on main power when I went on (garble) external power.

No.

Okay.

But the isol valve shouldn't affect recharging.

It shouldn't.

But even with the, you know, even with one isol valve closed for example, you can crossfeed both tanks.

Well I'm not getting a gage pressure (garble)

Are you getting pressure down there on the FSS?

Yes, I've got --

Got the connector fully rotated?

Yes. Well let's try again we'll tighten some more.

Till the button pops out.

Okay, that's it, wasn't quite, wasn't quite there.

Yes, the buttons got to pop.

Turned about another, oh, maybe 32nd of an inch.

I noticed from this one, I didn't exactly spring off the trunnion pin like I was springing off the SESA's trunnion pin. I don't -- when I back the jaws.
SPACECRAFT This (garble) Cinema 360's rolling. You may have seen the dome.

SPACECRAFT Okay.

SPACECRAFT Pressure at 2,100 pounds, supply pressure and about the same. Excuse me, 2,200. So you're topped off here now Bruce. Is that enough to do your evaluation?

SPACECRAFT I think so.

SPACECRAFT Okay, I've (garble) out of the bay side here.

SPACECRAFT Yes, the Orbiter's all interconnected anyway.

SPACECRAFT Bruce, could you go ahead and make a docking for the 360 there.

SPACECRAFT Yes, I'm going back down.

SPACECRAFT You have about another 30 seconds.

SPACECRAFT Hey, Houston, you still with us? There's a dock.

CAPCOM Roger, Bruce, we watched it all.

SPACECRAFT The view isn't quite as exciting from this position as the (garble) one but it works.

SPACECRAFT You're just slowly - Feels like I worked back out from the 1/4 inch position to the, right on the arrow. Hey, I'm going to try just backing off with just the jaws closed and not the bolt engaged to see what happens. Yes, there's your answer. There's a difference between the trunnion pin here on the SPAS and SESA trunnion pin. I'm going to turn to SESA again in a hurry.

END OF TAPE
SPACECRAFT  -- SESA's trunion pin. I'm are going to turn to try the SESA again in a hurry. McCandless, that 360 is still watching, here I come.

SPACECRAFT  I (garble) watch, you going to do a fly by.

SPACECRAFT  Yes.

SPACECRAFT  Well, we'll turn it back on.

SPACECRAFT  Okay Vance, GN2 recharge is complete on the port MMU.

SPACECRAFT  Okay good.

SPACECRAFT  (Garble) 360 is rolling.

SPACECRAFT  (Garble) on Rl3L MMU GN2 supplies. Valve's closed.

SPACECRAFT  Okay MMU valve's coming closed.

CAPCOM  Challenger, Houston. Bruce, looks like time for one quick soft dock there and then back to the FSS.

SPACECRAFT  Okay. I had my SPAS 16 mm running for a while, I went back, it was off. Do you have the capability of turning them off from there?

CAPCOM  Stand by, Ron.

SPACECRAFT  And Vance, I'm going to stow the battery bag back in the airlock.

SPACECRAFT  Okay Bob and after that, we're just waiting for Bruce to get back and service GN2 in the MMU so that you can jump into it.

SPACECRAFT  Well, I hope so. He promised me I could fly.

SPACECRAFT  Did you get that in blood? Hadn't you heard about avoiding verbal orders?

SPACECRAFT  Heck, I don't care, Bruce, I've got one down here myself all gassed and ready to go.

SPACECRAFT  Okay, now on this trunion pin, it does not seem to be, now it's backing out a little bit. See if I can fly out.

CAPCOM  Challenger, Houston, for Ron.

SPACECRAFT  Go ahead, Houston.
CAPCOM      Roger, Ron, we do not have command capability to those cameras right now, we can build them, why were you asking?

SPACECRAFT That's okay, I had it running, and I was wondering when I came back to it, I found it off, and I was wondering did you have - did someone down there to do it. I'll try it again.

CAPCOM      Okay, understand, Ron, thank you.

SPACECRAFT Bruce, we need you back into the FFS.

SPACECRAFT Coming in.

SPACECRAFT You're into Bob's flying time now.

SPACECRAFT Coming in.

END OF TAPE
SPACECRAFT  Coming in.

SPACECRAFT  I demand an extension.

SPACECRAFT  Feel like I'm bumping into something.

SPACECRAFT  Will it shorten the timeline if I just take the port MMU and - It probably wouldn't. I'd have to get the T-pad. Are you doffing the T-pad, Bruce?

SPACECRAFT  Yes, I'm going to swing over to the side so I can turn around.

SPACECRAFT  Okay.

SPACECRAFT  I didn't come in from the top since that TV camera (garble) down by itself. Can you see if all the tethers and (garble) are clamped back in.

SPACECRAFT  Yes, it looks clear.

PAO  Bruce McCandless backing into the Flight Support Station with his manned maneuvering unit and will shortly grasp the rings which are located on the arms of the MMU after he has tethered himself here, of course, and those pull rings will release the latches that secure the life support system on his back to the manned maneuvering unit.

SPACECRAFT  Bruce, we see your sequence is MMU doff, MMU closeout and T-pad attached to MMU and then GN2 servicing starboard MMU.

PAO  Just about a minute left of TV through TDRS and the image may begin to break up shortly as we go toward the horizon of TDRS coverage.

CAPCOM  Challenger, Houston. We're 50 seconds to LOS. Guam next at 00 00 and, Vance, everytime that you take EMU status checks from now on we would like you to also record sublimator pressure and also the temperature control valve setting. If we have a reoccurence of the sublimator pressure caution/warning message on the DCMs, we would like you to ahead and perform the same procedures you did last time.

SPACECRAFT  Okay. How about - -

END OF TAPE
CAPCOM       -- sublimator pressure and also the temperature control valve setting. If we have a reoccurrence of the sublimator pressure caution/warning message on the DCMs we'd like you to go ahead and perform the same procedures you did last time.

SPACECRAFT   Okay, how about a --

PAO          This is Mission Control Houston. It's 5 days, 23 hours, 40 minutes mission elapsed time. We'll be picking up voice only through Yarragadee in 8 minutes.

SPACECRAFT   Brought these small cutters while you're here. Here, why don't you just show it down on that Christmas tree for me then I won't have to fight it.

PAO          This is Mission Control Houston. We're going to pick up some of the UHF chatter of the EVA crewmen but due to the peculiarities of this configuration there won't be any uplink comm from the Mission Control Center through Yarragadee. Our next opportunity for discussion with the crew will be through Guam on the ascending node of orbit 97 and we'll pick up Guam in about 10 minutes. Mission elapsed time 5 days, 23 hours, 50 minutes. This is Mission Control Houston. And as an additive there's been some inquiry as to whether the checkout of the remote manipulator system earlier in the mission may have somehow contributed to the failure experienced today and the RMU Systems Officer in the Control Center asserts that there's really no way you can verify that at this time, that, you know, conjecture would seem to maybe suggest that but until we get the remote manipulator system back here on Earth and get a real live technician to look in there and poke around and verify the nature of the failure it's impossible to speculate on what might have caused that failure at this point. At 5 days, 23 hours, 51 minutes this is Mission Control Houston.

SPACECRAFT   Depending on how you look at things.

SPACECRAFT   You never saw any boots with rotors on them.

SPACECRAFT   But you've never seen a (garble) wing bird either.

CAPCOM       Challenger, Houston, through Guam for 6 and 1/2. We have a 40 second keyhole in about a minute and 1/2.

SPACECRAFT   Okay Jerry. Bob got up and airborne at PET 2 + 58 and he's at the back of the bay getting ready to do a little docking, just feeling it out.

CAPCOM       Okay great, Vance. Thank you and I've got a couple switches on panel Li.
SPACECRAFT     Okay, go ahead. Hoot's over there.

CAPCOM        Okay. RAD control outlet temp high, flash evap
              controller primary A to on.

SPACECRAFT    Okay, that's done, Jerry.

CAPCOM        Thank you, sir.

SPACECRAFT    Jerry, we got the cabin pumped up with nitrogen
              since we last talked to you too. It's about 10.4, 10.3,
              somewhere in there.

CAPCOM        Okay, Vance. Thank you, that'll make ECOM happy.

SPACECRAFT    (Garble) a bit of a gas hole but it's the (garble)
              offset.

SPACECRAFT    I noticed that.

SPACECRAFT    And Houston, Bob got started off with 2000 and 2100
              in the 2 tanks at the beginning of this MMU.

CAPCOM        Okay, Vance. Copy that, thank you.

SPACECRAFT    Just kidding Bob a little bit about flying
              something that doesn't have rotors above it.

END OF TAPE
SPACECRAFT  just kidding Bob a little bit about flying something that doesn't have roters above it.

SPACECRAFT  Okay, there's a good soft dock. (garble) Come off this time. I'll try to command a little upper angle this time see whether we bounce off or not.

SPACECRAFT  Okay.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Challenger.

SPACECRAFT  Say Jerry, do you want that mass spec to remain on, it's been on 50 (garble).

CAPCOM  Stand by we'll ask payloads. Challenger, Houston, Ron, that's affirmative, we want the mass spec to remain on.

SPACECRAFT  Okay, Jerry, thank you.

SPACECRAFT  Okay, Vance, I did a docking that time, what I would estimated to be about a 15 degree, or 10 degree at least off-set and go up and did fine. The primary T-pad seems to work a lot smoother with a lot less force required than the second (garble) it may be just because of the mass of the system, moving in. I'm going to make this one a hard dock.

SPACECRAFT  Okay, Bob, we noticed after docking out there, Bruce looked like he was flexing out on the end of the trunion pin a little bit. Do you find it very flexible out there?

SPACECRAFT  It's kind of flexible, but not bad.

SPACECRAFT  Hold still a second. Okay.

SPACECRAFT  Okay, it looks like, and I'm really not on the pin, even though it did soft dock. Oh, yes I am, there it is. Got to be patient.

SPACECRAFT  (Garble).

CAPCOM  Challenger, going over the hill, Guam. Hawaii in 7.

SPACECRAFT  Okay, see you in Hawaii.

PAO  This is Mission Control Houston, we've lost signal through Guam, and we'll acquire through Hawaii in 6 1/2 minutes. We got to easedrop on some of the dialogue between EVA 2, Bob Stewart and the CDR, Vance Brand, discussing Stewart's MMU work and coming at a time when he was doing some docking
maneuvers on the shuttle pallet satellite. On the NASA select
presently in the center of the screen, a couple of very
interested spectators. Seated immediately behind the capcom,
speaking with the capcom, is George Nelson, and in the center of
the screen standing, Jim Van Hofton, or more familiarly known,
Pinky and Ox who are going to be the EVA crewmen on Mission 41-
C. And let me give you from left to right, in the center of the
screen is Astronaut, John Blaha, whose the capcom for the orbit
team; next to him is Pinky Nelson; then was Jerry Ross, the EVA
capcom; and at the right, Jim Van Hofton. As the (garble)
indicates there will be no TV through Hawaii. Also there will be
no press conference, with Flight Director Randy Stone. Stone's
shift was only about 2 and a half, 3 and a half hours this
morning, uneventful, and any change of shift briefing would have
occur during the EVA, and it a--

END OF TAPE
PAO there will be no TV through Hawaii. Also there will be no press conference with Flight Director, Randy Stone. Stone's shift was only about 2 and a half, 3 and a half hours and uneventful, and any change of shift briefing would occur during the EVA and it seems more reasonable to use the time to cover EVA activities. We'll have Hawaii in 4 minutes. At mission elapsed time 6 days, 0 hours, 9 minutes, this is Mission Control Houston.

CAPCOM Houston, Challenger. Be here in a minute.

SPACECRAFT Challenger, Houston, Hawaii for 8 minutes.

SPACECRAFT Roger, Houston, Bruce has something to ask you here. Yeah, I'm looking forward to the engineering evaluation, Jerry. We had planned to go up and down the port longeron, so the RMS elbow TV camera could look down on the translation. Obviously the RMS is still broke. It would probably make more sense to go up and down the starboard longeron and use the ranging device on the Z and (garble) TV camera.

CAPCOM Okay, Bruce, that sounds like a good idea. We'll see what the guys on the ground think.

SPACECRAFT You heading back to the stable.

SPACECRAFT Yeah, I got a thousand pounds on B side, I might do a little maneuvering up in here to kind of get the feel of it. What I'm getting so far, uses up, kind of fly around with a (garble) mode on, I thought I liked that up in Denver, but I'm not so sure I like it with this mass on the front here.

SPACECRAFT Is that (garble) or active inhibit.

SPACECRAFT Sep step. But when you kind of, when you do a (garble), kind of translates you around also, generally, what you want to do. Oh, okay. But, I'm not so sure that I like it, not haven't really done it here.

SPACECRAFT Jerry, do you have TV up?

CAPCOM That's affirm, it's coming in a little scratchy right now, we can see what I think is the headlights of the guys helmets but, (garble) once in a while off the PAM sunshield there.

SPACECRAFT A good view of you right in front of our window (Garble)

SPACECRAFT You can't do this in a helicopter either.

SPACECRAFT Sounds kind of like helicopters are extremely
SPACECRAFT    Attack. Attack.

SPACECRAFT    Well, you know, some people are (garble) aviators, some are not so, people who lack experience. Okay, now this is a little different orientation.

SPACECRAFT    We have a good look at your T-pad there.

SPACECRAFT    How do you like it?

SPACECRAFT    Can you keep it aligned directly on our window, while your doing that?

SPACECRAFT    Let me see. Now I'm changing my coolant, Vance, I'm (garble) down there.

SPACECRAFT    Okay.

SPACECRAFT    I'm going down to one for a while, (garble) zero.

SPACECRAFT    Okay, you've got about 1/2.

SPACECRAFT    Okay.

SPACECRAFT    I can read it from here.

SPACECRAFT    Good.

SPACECRAFT    Jerry, Bob's just about to finishing up his translations here on the dark side of the world, and looks to me like we're just about back on schedule again.

CAPCOM        Okay, Vance, copy that, that sounds good.

END OF TAPE
SPACECRAFT  -- we're just about back on schedule again.
CAPCOM     Okay Vance. Copy that. That sounds good.

SPACECRAFT Houston, Challenger. Looking at the SPAS power, we're getting alerts on the SM computer and we're seeing his amps go up to 11 amps from the normal reading of 6 over on battery A.
CAPCOM     Copy that, Challenger. Payloads is looking at it.
SPACECRAFT What he's doing, Jerry, he's generally running about 6 amps and then I'm seeing him hop up to about 11 and 1/2 briefly and then back to 6.
CAPCOM     Copy that.
SPACECRAFT You look like you feel right at home in that thing, Bcd.

SPACECRAFT I do, Vance, it's really easy to fly. It's a really nice little machine. I just wish it had a little bit more gas on it. It's kind of like a T-38, you know, it's a great little maching but sure does need longer legs.

SPACECRAFT You're going a lot faster than a T-38 right now. Good, getting pretty good range.

SPACECRAFT Oh yeah.
SPACECRAFT (Garble) isn't so great but the range is pretty good.

CAPCOM     Challenger, Houston. 30 seconds LOS Hawaii. Couple minutes to TDRS and for Hoot, it looks like the SPAS is operating nominally. It may have been just some drops in the PI.

SPACECRAFT Okay, Vance. I got a sublimator P message again.
SPACECRAFT Okay, and water off, huh?
SPACECRAFT Water's off.
SPACECRAFT Catch that, Jerry?
CAPCOM     Roger we copy that. Pressure please?
SPACECRAFT 4.2.
CAPCOM     Copy 4.2. See you in a couple on TDRS.
SPACECRAFT Okay.
PAO        This is Mission Control. We have a short break in communication between the Hawaii pass and the tracking data relay satellite. Commander Vance Brand reporting the crew is about back on the normal EVA timeline and fairly shortly they'll be moving on with hydrazine transfer device simulation. That will be using a special tool intended for future satellite servicing to transfer hydrazine into satellites which have depleted their supply which is used for attitude control. This will be, this test will be done using freon with a dye in it.

SPACECRAFT  (Garble) valves and all that stuff.

PAO        And we have the crew back through TDRS.

SPACECRAFT  Yes --

SPACECRAFT  We have you closing ISOL valves with THC input 1 and 1/2 second +X command and then THC counterclockwise to stop. These are additions --

SPACECRAFT  Rolled them into his cuff checklist.

SPACECRAFT  Green yet, huh?

CAPCOM      Challenger, Houston through TDRS and we're getting good TV.

SPACECRAFT  Okay Vance. If I could have some nitrogen again for your isolation valve, please.

SPACECRAFT  Roger, coming on.

SPACECRAFT  And Bruce, you get the fun job of restowing the TPAD.

SPACECRAFT  Okay, do you want me to do that now.

SPACECRAFT  Yes, if it's off and ready to go.

SPACECRAFT  Okay.

END OF TAPE
SPACECRAFT    -- if it's off and ready to go.

SPACECRAFT    Ok. Houston, Challenger.

CAPCOM        Go ahead, Bruce.

SPACECRAFT    Yes, Jerry would you find out what the final
desired configuration is, the FSS nitrogen quick disconnects for
re-entry.

CAPCOM        Ok, we'll get you an answer on that.

SPACECRAFT    The isolation valve to close, please, Vance.

SPACECRAFT    Coming close.

PAO           You see the Trunion Pin Attachment Device floating
around on its tether. Astronaut Bob Stewart will be stowing that
shortly. Stewart reported another message from his EMU,
sublimator pressure, the sublimator a part of the cooling system
of the space suit. He may be working a malfunction procedure on
that. That occurred also during the first space walk, he went
thru a troubleshooting procedure and that system was returned to
normal.

CAPCOM        Challenger, Houston, for Bruce, regarding your
question on the quick disconnects. Bruce, we'd like them open to
flow.

SPACECRAFT    I understand you want them fully engaged and open
to flow.

CAPCOM        That's a roger.

SPACECRAFT    Ok.

SPACECRAFT    And Robert, after MMU doff, and MMU close out, then
you'll be translating as your next step later to the SESA to
access the hydrazine connector experiment.

SPACECRAFT    Ok. After what's his name here gets out of your
way.

SPACECRAFT    Well, probably won't be out of the MMU by then.

SPACECRAFT    And Bruce, your next steps will be MMU prep over at
the port MMU.

SPACECRAFT    Ok. Oh, yes, the jaws on this thing has to be
tripped, don't they?

SPACECRAFT    Yes.
Now, let's see what we've got.

Is the force measurement device on one of the hydrazine tools.

It says use the force evaluation device --

(Garble) I just used the wrist tether.

Challenger, Houston, suggestion for Cinema 360 cabin ops.

Go ahead, Jerry.

Ok, Ron, if time permits, Payloads suggested that you try getting some cabin Cinema 360 pictures out the window using your 25 mm lens, of the EV activities during the night pass. And they suggest all you have to do is simply close down the f-stop, 3 steps from the setting that is being used for your still cameras.

Close it down or open it open up?

Ok, open up 3 steps from the setting used for the stills. And I take it I have to use the same spot meter configuration, ASA 500 at a 60th.

Check sublimator.

Ok, stand by, I'll make sure we got that right, f-stop configuration here.

As you can see, Jerry, I have that camera set up in the window, waiting for a little bit of light to do that. You can't see, but there's the Cinema 360 ready to fire away.

Bob, what's your sublimator pressure now?

Wait a second, Vance.

What's this funny looking thing with EV-2 written on it?
SPACECRAFT Yeah, let's head for the barn. Okay, I got you. Bruce, watch that you clear the SESA door, I going to take you up aft. Okay, I'm clear. Vance, for your information, the power tool batteries stays in the power tool. One that's in your checklist refers to the one that early in the airlock. Okay. Got that one cleared up after the last sims.

PAO Looking at the special equipment stowage assembly on the starboard side of the Orbiter's payload bay.

SPACECRAFT I intend to bring a large trash bag inside with us, since it has my cuff checklist in it. Okay, that's an addition. Okay Bruce here we go. Ready whenever you are.

CAPCOM Challenger, Houston, reminder Ku to standby, please.

SPACECRAFT Ku to standby.

CAPCOM Roger, Vance, I've got several notes for you, if this is a convenient time to talk.

PAO And the crew has switched off the Ku-band antenna.

SPACECRAFT Copy.

CAPCOM Okay, Vance, we're back with you, did you say you're ready to copy?

SPACECRAFT That's affirm.

CAPCOM Okay, the first one has to do with a star alignment. At 4 + 50 we would like you to clear the star tables, on spec 22, do an item 20, and check with the trackers, are track, items 3 and 4. Rationale is, that will be after Serius, LOS, allow us to hopefully pick up stars 42 and 25, at approximately 5 + 20. If you don't get those, leave them in track through the next night pass. This is helping us set up for a low g period, heat pipe work later on this evening. Secondly, we would recommend to troubleshoot Bob's vox, prior to the second EVA. Before getting back into the airlock, swapping modes, that is, Bob would go to I think, believe alpha, and Bruce would go to bravo, and see if that helps with the vox problem at all. Regarding Bob's foot restraint problem, we would suggest before depressurizing the suits in the airlock, that Bruce and Bob investigate using the airlock foot restraint to see what the possible problems might be with his boots. And the last item is we would like to get a full status check you can record it onboard, at egress from both suits, over.
SPACECRAFT  Bruce, what orientation do you want to go in on that. With the end effector outboard, do you want to go in the way you are now, or do you want to be parallel to the longeron. I want to go in with the stretch and crosswise, just like you we're going to drive them right on down into the thing. Got you, that's the way you are now.

SPACECRAFT  Okay read back. At 4 + 50, you'd like to clear the star table, with an item 20 on spec 22. Put it into track, we're going to try for stars 42 and 25 at 5 + 20, only thing we wanted to clear, is that a rolling maneuver? Or is that a commercial attitude for the (garble).

CAPCOM  Vance, it will be just stars of opportunity as your going -

END OF TAPE
CAPCOM Vance, that will be stars of opportunity as you're going along in attitude.

SPACECRAFT (Garble) you come to my right, and my coordinate systems run, for aft, there we go, to right. Keep coming right.

SPACECRAFT Okay, Jerry, the time was real (garble) static, you'll have to repeat.

SPACECRAFT Keep coming right.

CAPCOM Roger, Vance, it does not require a maneuver for the star aline that we gave you. Expected is 5 + 20 for those two stars. If you don't get them, leave them in track through the next night pass.

SPACECRAFT Come right a little more.

SPACECRAFT Okay, understand.

SPACECRAFT Okay, stop, forward. Forward on my coordinates, forward. Bruce, if you're going to guide me in there, I go to payload mode and check your commands. Roger, okay, I'm sorry, I thought you were in -. Go to payload. (Garble) Okay forward.

PAO This is Mission Control we'll be having a playback of the MMU EVA operations at about 11:15.

SPACECRAFT (Garble) stop. I'm going to get in my self (garble) safety tether at this point. Certainly check out Bob's foot restraint in the airlock, in that foot restraint, and you'd like a (garble) EVA status check at the end, and enumerate on that a little bit.

CAPCOM Roger, Vance, that purely for engineering post EVA data, we'd just like you to have both guys read through their full status list, and record it. We'll get it from you later, probably post mission. Further on the foot restraint checkout in the airlock, it's probably best if you leave the suits pressurized before you do that.

PAO Mission Control Houston, 4 days, 4 hours, 7 minutes, we're almost 5 hours into this spa.e walk. The crew is wrapping up their activities and preparing to conclude the EVA. We'll be having a satellite playback of the television of the orbit 67 EVA MMU operations beginning at 11:15. We have about 13 minutes remaining in this acquisition period through the tracking data relay satellite, then we will have loss of signal period for about 20 minutes, where we will have no communications with the crew.

CAPCOM  Challenger Houston for Vance, we had a comm drop, do you have any further questions.

SPACECRAFT  (garble) now forward into payload. (garble)
SPACECRAFT  Nothing for now Jerry, we'll see you a little later.

CAPCOM  Okay, we're about 11 minutes till LOS, I'll give you another call before we depart.

SPACECRAFT  Okay. After Bruce gets the MFR put away, why we're going to clean up and bring them both back in, check good, make sure there's nothing left loose. Bob, come right in payloads. I'm right going right.

SPACECRAFT  And you didn't have anything else while they were out right, Houston?

CAPCOM  That's affirm, Vance, the only thing is your option, the camera delta.


END OF TAPE
SPACECRAFT All right.
SPACECRAFT Hold it right there.
SPACECRAFT Ok, extend.
SPACECRAFT Ok, standby. (garble)
SPACECRAFT Ok.
SPACECRAFT (garble) are you ready for the extension?
SPACECRAFT Extend, yes. (garble)
SPACECRAFT Ok, Bruce we can release it whenever your ready.
SPACECRAFT Ok release. Ok, take the RMS up. And the end effector mode back away. Beautiful Bruce, we're in there.
SPACECRAFT Good show, Bruce.
SPACECRAFT That's a good way to get to get it in there Bruce, just let the arm drop it right down there.
SPACECRAFT Ok, I'm proceeding to pull the extension up. Ok, the extension is up and locked. (garble) are open. Start your payload bay cleanup countdown, (garble). Collecting tethers right now.
SPACECRAFT Ok Bruce. I can start reading off things to do as soon as you're ready here, I'll pick it up.
SPACECRAFT Yes, go ahead.
SPACECRAFT Ok, steps here, 2 columns, remove MFR tool boards to the trash bag and stow MFR tool boards in trash bag in the SESA.
SPACECRAFT Ok, MFR tool boards are already stored in the SESA. And I'm going to bring the big trash bag in with me. If you want to take the time, I can put the small one in the CBSA or I can bring it in.
SPACECRAFT Your judgement.
SPACECRAFT I'll put it in the CBSA.
CAPCOM        Challenger, Houston. We're about 5 minutes to
LOS. Guam is next at 04 + 43. We understand you're terminating
your operations in the cargo bay and just a reminder after you've
got your MMU batteries changed out, etc., that if you haven't
done camera delta already, let's delete it.

SPACECRAFT    Okay, understand if we haven't --

END OF TAPE
CAPCOM 143, we understand you're terminating your operations in cargo bay, and just a reminder after you've got your MMU batteries change out, etc., that if you haven't done camera delta already, let's delete it.

SPACECRAFT Okay, understand, if we haven't done it already to delete it, so we'll delete it.

CAPCOM Okay, copy that Vance, and we'll see another camera over temp, Vance.

SPACECRAFT Another camera over temp, okay we'll check. I thought we just (garble) camera delta, Vance. Camera charlie. (garble) What. (garble) back far enough. Hey, Bruce? Yeah. I wouldn't worry about delta, unless you especially want to. I'm just securing my tether lines here. You're call. Yeah, let's do it on, later, or not worry about it. Okay. Thethere line here. Incidently, where's the ranging device at this point, do you know. In the large trash bag. Hey do you want delta pointed some way. I can do that, I'm right here. Stand by. It's tilted down a little too far, you might tilt it up a little bit. How's that? Ah. it's got something across the top of it, a dark line, is there something obscuring it? No. Okay, well maybe down just a little bit then. Like that? Yeah that's good. How about right or left? We can run it right or left, Bruce. Oh, okay. Okay, after trash bag to the Sesa, then it will be translate to the port MMU, remove MMU camera, thruster (garble) I used the batteries (garble) Bruce. You have or have not? Have not. I'll get that. On or off? What? We got a supplement D message. On or off? Head for the airlock and - Yeah come on in and get on the - Think that the SCU is right near the door. Should I take the number 1 SP- (garble) Okay.

END OF TAPE
SPACECRAFT Yes, come on in and get on the --

SPACECRAFT I think that SCU is right near the door. --
(garble) Think that number 1 SC is --

PAO Mission Control Houston, 4 days, 4 hours, 23 minutes, Mission Elapsed Time. We've had Loss of Signal thru the Tracking Data Relay Satellite. We'll have about a 20 minute LOS until we pick up over Guam. The crew was putting away the tools and the other items they've been using during the EVA and preparing to conclude the EVA just as we went LOS there, Astronaut Bob Stewart indicated he had a fault indication on the sublimator pressure reading on his EMU and he was going to move into the airlock to check that out. Crew has been on EMU power for 5 hours and 13 minutes, that's been a very long Shuttle space walk. They have been checking out the Manipulator Foot restraint as well as the MMUs and both astronauts conducted translations away from the spacecraft of distances of greater than 300 feet checking out those MMUs. We're at 4 days, 4 hours, 24 minutes, Mission Control Houston. This is Mission Control Houston 4 days, 4 hours, 40 minutes Mission Elapsed Time. We're about 2 minutes away from the Guam Station. The crew should be just about concluded with the EVA, this first check out of the Manned Maneuvering Units and the other specialized EVA equipment. During the space walk Astronaut Bruce McCandless total time in the MMU was about 1-1/2 hours, we don't have an exact time, but approximately 1-1/2 hours for Bruce McCandless in the MMU. And Bob Stewart's total time in the MMU was slightly more than 1 hour, about an hour and 4 or 5 minutes. The crew managed to get quite a number of the items for this EVA accomplished, both MMUs were checked out, both crewmen took their MMUs out to the prescribed distance of 300 feet from the Orbiter, stabilized those and brought them back. We had some check out of the manipulator foot restraint, the trunion pin attachment device, and did some evaluation of the stability of the arm with the manipulator foot restraint on it. The crew, it's believed did not change out camera delta, the payload bay camera which has been giving some trouble since the first flight day. It was hoped we would be able to change out that camera to get some better EVA views during the 2nd EVA, but they ran a little short of time and toward the end, they were told they could delete that changeout. Should be acquiring momentarily over the Guam station, this is Mission Control Houston.

CAPCOM Challenger, Houston with you thru Guam for 5 minutes, possible keyhole.

SPACECRAFT Roger Jerry, loud and clear, and they're just about ready to go inside, advise that we switch comm modes between the crewmen and the swap worked.
CAPCOM      Roger, copy that Vance, and can you give us some details on Bob's sublimator pressure message please.

SPACECRAFT  He got it restarted again, maybe I'd better let him tell how.

SPACECRAFT  I'll talk to you about it after I get in, Jerry.

CAPCOM      Standby Bob, we'd like to understand what happened, we may want to do some troubleshooting prior to that.

CAPCOM      Challenger, Houston for Bob.

SPACECRAFT  Hold on a second. All right Jerry, I got a sublimator G message (garble) --

END OF TAPE
CAPCOM    Challenger, Houston for about -

SPACECRAFT Hold on a second. Jerry, I got a sublimater P message. Sublimater P 4.5, turn H2O off. Did that, did the mail procedure, everything's fine.

CAPCOM    Okay, copy 4.5 was the pressure. You turned the water off, back on, and it's okay now?

SPACECRAFT Yeah.

CAPCOM    Roger, thank you.

CAPCOM    Challenger, Houston for Bob. We would like a current sublimater pressure reading please.

SPACECRAFT Okay, Jerry. Just a minute. 2.5.

CAPCOM    Roger, copy 2.5 Bob?

SPACECRAFT Affirm.

CAPCOM    Okay. And Challenger, Houston for Bob. One last question hopefully. What was your temperature control valve setting when you got your message?

SPACECRAFT Oh the low number's probably about 3.

CAPCOM    Copy 3.

SPACECRAFT Bruce are you finished with (garble).

SPACECRAFT Yeah. I got the (garble) tethered to the rail here and well I guess I can go ahead put my rail back in the box, and I'm ready to (garble).

SPACECRAFT Very good.

CAPCOM    Challenger, Houston. We're less than 1 minute till LOS. 7 minutes till Hawaii and be advised we'll be using the alpha camera at Hawaii to look at the mass spec. We're going to be doing some commanding.

SPACECRAFT Okay, we copy that Jerry. You'll be using the alpha camera at Hawaii.

CAPCOM    That's affirm.

SPACECRAFT (garble)
PAO Mission Control Houston, 4 days, 4 hours, 49 minutes mission elapsed time. We have about 6 1/2 minutes before we pick up over the Hawaii station. Mission Specialist, Bob Stewart, clarifying the situation with the sublimator on his spacesuit, that's part of the cooling system. Just before we lost signal through the tracking data relay satellite the previous pass, he indicated he had a high pressure alarm in the sublimator and he was advised by his partner in the spacewalk, Astronaut Bruce McCandless, to head for the airlock. He went through a malfunction procedure, checking out the sublimator, and the problem corrected itself and is functioning normally. Crew is concluding their EVA, still outside at the moment, but they are about to get back into the airlock very shortly. They have been on the EMU's for 5 hours and 40 minutes. During that long shuttle spacewalk, we had some considerable list of the items of

END OF TAPE
SPACECRAFT    Start ZLV at 8 15, okay.
CAPCOM        Challenger, Houston.
SPACECRAFT    Okay.
CAPCOM        Roger Vance. That means that you would be deleting
              the IMU align at 4 days, 7 hours and 20 minutes and once you get
              42 and 25 on the table you can go ahead starting at step 3 in the
              orbit ops checklist of the IMU roll align procedure on page 7-
              5.  Over.
SPACECRAFT    Yes. Okay, well we understand and we're setting up
              for a future maneuver to ZLV at 8 15. And Mary, let me get 2 or
              3 action items we had, get back with you on right now.
CAPCOM        Okay, we're ready.
SPACECRAFT    Okay, we missed this table line on the last rev
              because we were busy getting the crew in and frankly we just had
              too much going on. But we're happy to be getting it this rev.
              The next thing was Bob's box. We think we've solved the problem
              of his clipping by switching Bruce and Bob on comm modes as
              recommended. The third thing was Bob's foot restraint --
END OF TAPE
PAO
   —- checklist and that concludes all of their EVA activity for today. They are now in the scheduled sleep period, or presleep period, excuse me. Included in that time is some meal preparation, IMU alignments and miscellaneous other things getting ready for their sleep period due to begin in 3 hours. Just a reminder that we will have a Change-of-Shift Briefing with the off-going Flight Director, John Cox, who was the Flight Director in Mission Control today during the space walk. That briefing at 1:30 Central Time will be in Building 2, room 135, here at the Johnson Space Center in Houston. At 4 days, 6 hours, 1 minute mission elapsed time, this is Mission Control Houston.

CAPCOM
   Challenger, Houston with you through Guam for 2 minutes.

SPACECRAFT
   Hello Houston, your loud and clear.

CAPCOM
   Got you loud and clear, too.

PAO
   This is Mission Control. The Change-of-Shift Press Conference with Flight Director John Cox, due to begin —-

SPACECRAFT
   Mary, you caught us just as we were starting to pump the cabin back up with N2.

CAPCOM
   Copy that.

PAO
   That Press Conference due to begin in about 10 minutes at 1:30 Central Time, Building 2.

CAPCOM
   Challenger, Houston. We're about 15 seconds LOS. We'll pick you up in about 8 minutes through Hawaii at 6 + 31.

SPACECRAFT
   Ok, Mary, we'll see you in Hawaii.

CAPCOM
   Challenger, Houston with you through Hawaii for 8 minutes.

SPACECRAFT
   Okay, very good and Mary just out of curiosity, are we picking up both stars with the z-trackers on this alignment?

CAPCOM
   That's affirmative, Vance.

SPACECRAFT
   Okay and then after we pick up the second star, you want us to go to the ZLV, right? Just like in the CAP, except it's after a rather different sort of alignment.

CAPCOM
   Roger, Vance. We'd like you to do a couple of things. Delay the yaw sensor activation step 1 until 08 30 when you're back in the -ZLV. And Vance, I would have you delaying the maneuver to the -ZLV nose forward to 8 15.
CAPCOM: Okay, and we're about 3 1/2 minutes till LOS. If you go over the hill before we catch you, we'd like to go back to 179, and 116.

SPACECRAFT: Okay, here they come. Okay, Jerry, you should have them.

CAPCOM: Okay. We're looking. Challenger, Houston, we're going LOS TDRS, you're go to change back to TFLS 179, 116.

SPACECRAFT: Okay, understand, Jerry, we go back to 179, 116.

CAPCOM: Roger that, thank you.

PAO: Mission Control Houston, 4 days, 5 hours, 59 minutes, mission elapsed time. We've had loss of signal through the tracking data relay satellite, Challenger out over the Indian Ocean, about to start orbit number 69. And it's a little over 22 minutes before we reacquire communication with the crew again, that will be over the Guam station, a very low elevation pass, just 1.8 degrees, may or may not have any communications with the crew then, if not we'll pick up again over the Hawaii station, about 31 minutes from now. Crew has completed the post EVA checklist, and that concludes all their EVA activity for today. They are now in the scheduled sleep period, or presleep period, excuse me, that included in that time is some meal preparation, IMU alignments and miscellaneous other things, getting ready for their sleep period due --

END OF TAPE
CAPCOM: We're sending you up a new state vector and pass along to Bruce and Bob, that we've got the mass spec back in operational mode. It's not fully operational, but it's something that we can use.

SPACECRAFT: Okay, hey, that's a good deal, glad to hear that. One other thing, Jerry, with the cabin pressure and the PPO2, being what it is, it looks to us like we need to pump nitrogen tonight in the presleep, do you agree.

CAPCOM: That's affirm, Hoot.

SPACECRAFT: Okay, great, thanks. Houston, Challenger.

CAPCOM: Go ahead, Challenger.

SPACECRAFT: Yeah, Jerry, do we have that new state vector onboard yet, we're looking to tell Mr. Spock about it.

CAPCOM: That's affirm, it's onboard, Hoot.

SPACECRAFT: Okay, great, thanks.

PAO: This is Mission Control 4 days, 5 hours, 52 minutes. The crew moving through their post EVA checklist, and just about to enter into the presleep activity in the timeline. Getting everything ready for wrapping up the end of the day. We will be having a Change-of-Shift press conference, at approximately 1:30 central standard time, building 2, room 135, with Jon Cox, the Flight Director, who was in control of the activity here in Mission Control during the spacewalk today. That Change-of-Shifting briefing again at 1:30 central standard time, change of shift, with Jon Cox, Flight Director. Flight Directors here in Mission Control are surveying the items that they need to relay up to the crew in preparation for a crew sleep period. There's a few items that need to be done, some minor adjustments in the Orbiter cabin atmosphere, compensate for some of that loss during all the depressurization and repressurization, changes in the atmosphere for the EVA.

CAPCOM: Challenger, Houston, we'd like to change TFLS to look at some MMU data, and then switch back.

SPACECRAFT: Okay, great, which ones do you want?

CAPCOM: Okay, Hoot, we'd like 161, 103.

SPACECRAFT: Okay, we'll put those in right now, Jerry, 161 and 103.
CAPCOM Challenger, Houston, for Hoot. I've got a couple of messages.

SPACECRAFT Okay, Houston, go ahead.

CAPCOM Okay, the first one has to do with star of opportunity alignment. We would like you at the 06+20 to clear the star table, and ensure the trackers are in track. We're looking again for stars 42 and 25. You should have those at 6+50, after you get them, we would like you to align, using those stars, and copy down the numbers. Second item, is supply H2O dump, we would like to dump tank bravo, to 30 percent, and last item, is we would like not to tear down the interconnect. We want to remain interconnected over the sleep period, over.

SPACECRAFT Okay, Jerry, I think we copied all that 6+20, we'll clear the star table, put them in track. Looking for stars number 42 and 25, should get them at 6+50, do an align on those, dump supplies water tank bravo, to 30 percent, and we'll stay interconnected last OMS to RCS.

CAPCOM Okay, Hooter, that's all good. One other thing is we want you to copy the numbers on your alignment, we won't have you.

SPACECRAFT Oh, okay, sure Jerry, we'll do that.

CAPCOM Okay, we're coming up on 10 minutes to LOS. We'll have you next at Guam, in, at 04, I'm sorry wrong one. At 06+22. We're sending you up a new state vector --

END OF TAPE
PAO This is Mission Control at 4 days, 5 hours, 35 minutes. We've been seeing some television of the Mass Spectrometer mounted on the SPAS functioning. Apparently the crew work on that had some effect in enabling it to move again. We have 22 minutes remaining in this pass with the Tracking Data Relay Satellite. The space walk which ended about 30 minutes ago had a duration of 5 hours and 55 minutes. Crew has, of course, repressurized the airlock and has been loading their equipment that they brought back in with them from the airlock into the middeck and proceeding to get out of their suits. The crew did manage to bring in the delta camera, that's one of the payload bay cameras, the one that had malfunctioned earlier. The color wheel had stuck on that camera and part of its positioning control was not functioning. It was hoped that that camera could be replaced so that we could get some good views of the second EVA during which we should have a considerable amount of television. Toward the end of this EVA, we pretty well calculated that they were not going to have time to change that. They were actually told to go ahead and scrub the pulling of that camera. But apparently as they were about to come in, they did manage to have the time to take it off its bracket and bring it in the airlock with them. Part of its bracket will be switched out and it will be replaced with one of the cabin television cameras and that will be taken out at the start of the second EVA on Thursday. We expect to have a Change-of-Shift Press Conference with Flight Director John Cox, who has been controlling things here in the Mission Control Center during the EVA today, at approximately 1:30.

END OF TAPE
SPACECRAFT (Garble) Okay, if you can get (garble) H to EMU 2, bus select to off for 7 seconds.

SPACECRAFT Be sure you give EMU number 2. There's --

SPACECRAFT Yeah it's up towards our heads.

SPACECRAFT It's the one that says main A and main B and off. For EMU 2.

SPACECRAFT EMU bus select. (garble) auto. I think it's on B right now, from the, okay turn it off for 7 seconds.

SPACECRAFT OPS back in business. (Garble)
SPACECRAFT  Roger, it was a real thrill, a real honor to be up there. And Jerry, they got camera D on the way in the hatch too.

CAPCOM  Roger, we thought we copied that.

SPACECRAFT  It was sort of in the way, so we had to take it off.

CAPCOM  Yes, we understood that.

SPACECRAFT  Did you copy that we had to do a little TPAD maintenance to get the thing restowed?

CAPCOM  That's a negative, Bob.

SPACECRAFT  Ok, I couldn't rotate the secondary TPAD down, because one of the times was catching. So I had to get out some tools and work it in so I could rotate the secondary, and keep that down, but it stowed back again.

CAPCOM  Copy that, thank you.

SPACECRAFT  Bob, you need to help me get the upper pins in. Slide back and then up or down, 1 of the 2. (garble) Up or down?

SPACECRAFT  Hey, Ron?

SPACECRAFT  Ron?

SPACECRAFT  Go ahead, Bob.

SPACECRAFT  Could you bring me one of those EVA checklists down here.

SPACECRAFT  Ok, on the way.

SPACECRAFT  There we go.

SPACECRAFT  (Garble) I'm hearing Bob, over.

SPACECRAFT  (Garble) Battery gets too low.

SPACECRAFT  Okay and if you can get (garble) 18 H to EMU 2 bus select to off for 7 seconds.

END OF TAPE
SPACECRAFT    Okay, we'll get that as soon as the - (garble).

SPACECRAFT    Jerry, I've got my helmet and gloves off, and the Bpb has his gloves off and we're sort of deconfiguring here. We'll get to that on the checklist when we can.

CAPCOM      Okay, Bruce, copy that, and all of us on the ground want to send our congratulations for a super job today, we certainly enjoyed watching you, and only wished we could have joined you.

SPACECRAFT    Yeah, roger, it was a real thrill, a real honor to be up there. And Jerry they got camera D on the way in the hatch too.

CAPCOM      Roger, we thought we copied that.

SPACECRAFT    It was sort of in the way, so we had to take it off.

CAPCOM      Yeah, we understood that.

SPACECRAFT    (Garble) Did you copy we had to do a little key (garble) maintenance - -

END OF TAPE
SPACECRAFT  Vance? Here comes the MMU batteries and another camera. Can you move your right arm, Bob? Good. Here comes camera delta. Hey somebody, here comes camera delta.

SPACECRAFT  Do you see anything else?

SPACECRAFT  Yeah, here comes the large and small trash bags. And just for completeness here comes sun (garble).

SPACECRAFT  Well, what did you think of my EVA?

SPACECRAFT  I liked it, I thought it went well.

SPACECRAFT  (Garble) in PPT. I say, I got a problem right now that I won't go to (garble) R. R is to battery. I'll turn the fan off. Yeah, I guess I might as well. Wait, wait, wait, no, no, no. Go ahead with the checklist here.

PAO  This is Mission Control, it appears that --

SPACECRAFT  All right with the checklist.

PAO  It appears that McCandless was able to remove camera delta after all. Talking about handing it in through the airlock.

SPACECRAFT  Okay, O2 is off. Purge valve open. That's all right. Disconnect blowers, you say?

CAPCOM  Challenger, Houston.

SPACECRAFT  Yeah, go ahead, Jerry.

CAPCOM  Hooter, this is for Vance, Bruce and Bob. We understand Bob's having a problem getting power out of the SCU into his suit, is that correct?

SPACECRAFT  Yeah, that's affirm, Jerry. Connected up to the SCU umbilical power, and got SCU power, then we had a tangle in the SCU lines in the airlock, so I switched back to battery power, removed the SCU, untangled and reinstalled it, and couldn't get it to take SCU power again.

CAPCOM  Okay, Bob, what we would like you to do, is page 9-3 of the EVA checklist. That's under tab EMU contingency procedures. Display blank and airlock.

SPACECRAFT  That's in the EVA checklist, Jerry.

CAPCOM  That's affirm, y-3, under tab EMU contingency procedures.
SPACECRAFT  Ok, I'm showing 9.8 Vance. We're almost up to you.

PAO  The EVA ran a bit long --

SPACECRAFT  My suggestion would be to open both the equalization valves wide open right now, that's not in the checklist, but that should speed things up for the last tenth or so. Now it says go to post-EVA pg 5-2 in the EVA checklist.

PAO  Airlock pressure has been brought up to approximately cabin pressure. They're about ready to open the hatch into the middeck.

SPACECRAFT  We may have to take some of this spare stuff out of the airlock before we can do much good.

SPACECRAFT  Ok, 02 actuator off.

SPACECRAFT  No wait a minute, we've got to get some of this clutter out before we get to that. Bob's SCU has come off. Ok, Vance, here comes a camera. Vance?

END OF TAPE
PAO  This is Mission Control, we've had Loss Of Signal thru the Hawaii station. We'll pick up in about a minute thru Tracking Data Relay Satellite. Crewmembers Bruce McCandless, Bob Steward reading off the parameters, the indication on their EMUs on the consumables, the remaining oxygen and power following their space walk.

SPACECRAFT  Stand by for a mark, we got to SCU, it'll terminate the EDT. If you'll give us a mark and record MET.

SPACECRAFT  Ok, Hoot would you look for that.

SPACECRAFT  Ok.

SPACECRAFT  Ready, mark.

SPACECRAFT  Ok, (garble)

CAPCOM  Challenger, Houston with you through TDRS.

SPACECRAFT  Loud and clear, Jerry, through TDRS.

SPACECRAFT  Okay and (garble) with the airlock integrity check is go, 5.7 is what I'm still reading.

PAO  Crew bringing up the airlock pressure now, the EVA is concluded. Five hours, 55 minutes in duration.

SPACECRAFT  Vance, I submit the airlock pressure integrity check is go, I'm still reading 5.7 and it's been more than 2 minutes.

PAO  The airlock pressure holding solid.

SPACECRAFT  IV 1 innerhatch equalization valve 1 to normal and let her come up to cabin pressure.

PAO  Ron McNair in the middeck area, opening the valves to allow the cabin pressure to equalize with the airlock.

SPACECRAFT  They say it only goes down about 3 or 4 tenths.

CAPCOM  Challenger, Hoot, we saw that you just cleared the star table. We'll need to let you have another night side pass to see if we can catch those stars.

SPACECRAFT  Ok.

PAO  This is Mission Control, 4 days, 5 hours, 8 minutes. We will have a shift change briefing with off going Flight Director Jon Cox who came in to run the EVA. That will be at 1:30 Central Time, as opposed to 12:30 previously scheduled.
SPACECRAFT Where did that one go that I velcroed on the (garble). Okay, here's mine. Okay, I'm connect to the (garble).

SPACECRAFT Stand by just a second, I'm still working it. Now I got the strap in the way.

SPACECRAFT Now the two screws are wrapped around each other. (garble) We will unscrew it later. That's it, (garble) you activate an IV. EMU R2 valves on 82 B to open. Oh, yeah, status -

SPACECRAFT Want status before they open? I had 386, and - 386 psi.

SPACECRAFT Stand by 1. Roger, ready copy.

SPACECRAFT On EV 550, (garble) 116, 25 percent O2. 21 percent power, 15.42, O2 3272, (garble) 6200, battery volts dc, 16.4, battery amps 4.0, RPM 18.6K. CO2 point 2, water temp, 53. Gas pressure 14.9, water pressure 15.0, that's it.

SPACECRAFT Okay, Bob.

SPACECRAFT Yeah.

SPACECRAFT I thought I was ready, but would you read just a little bit slower.

SPACECRAFT Okay, where do you want me to start?

SPACECRAFT Just give me the whole thing again.

SPACECRAFT Okay. Time EV 551. Time left 119, 41 percent power, let me start that again. (Garble) consumables, 25%, O2. 30 percent power, 54.2, O2 B 270, (garble) 6200, battery volt dc, 16.5, battery amps, 4.0, RPM, 18.7. CO2 point 2, water temp, 52, gas pressure 14.9, water pressure 15.0, that's it.

SPACECRAFT Okay, Bruce.

SPACECRAFT Yes sir. Time EV 5+53. Time left 1+24, with 20 percent power (garble). 41 percent O2 remaining. Depresssure now 4.1, O2 pressure 394, 394. SOP 6170. Batt volt, 16.6, amps -

PAO This is Mission Control we've had loss of signal through the Hawaii station. We'll pick up in about a minute, through tracking data relay satellite. Crewmembers Bruce McCandless, Bob Stewart reading off the parameters, indications that on their EMU's, on the consumables, remaining oxygen, and power following their spacewalk.

END OF TAPE
remove the MP (garble) connect SCU to D&C and check lock. Okay, that's our next step. Where's that one go, that I, --

END OF TAPE
and the problem corrected itself and is functioning normally. Crew is concluding their EVA, still outside at the moment, but they are about to get back into the airlock, very shortly. They have been on the EMU's for 5 hours and 40 minutes. During that long shuttle spacewalk, we had some considerable, considerable list of the items planned, accomplished. Including the first checkout of the manuvering units, in which the astronauts in there spacesuits, with the EMU's attached, moved away at distances of greater than 300 feet from the Orbiter, not connected with any tether or any restraint of any kind. In affect, becoming individual spacecrafts of their own. The first time, a spacewalk has every been accomplished without the crewman being attached, by a lifeline or a tether of some kind, to the parent spacecraft. Also, checked out on that during this spacewalk, was the manipulator foot restraint, and the trunion pin attachment device two important pieces of equipment in future working in space, particularly in space construction and servicing of satellites and other equipment in space. Much of the work done here today, leads up to the servicing operations and repair of the solar maximum satellite on the next space shuttle mission, in April in which the shuttle rendezvous, with a malfunctioning scientific satellite, that has been orbit since 1980. Make some repairs to an electronics box, so that the satellite can control it's attitude, and perform it's mission properly. The EVA on Thursday, will include additional use of the MMU, and the docking with the rotating shuttle pallet satellite on the end of the mechanical arm, to simulate the docking with the solar maximum satellite to take place on the April flight. We're about 3 minutes away from picking up over the Hawaii station. This is Mission Control at 4 days, 4 hours, 52 minutes into the flight.

SPACECRAFT Okay, it's closed. 1 second. Okay airlock, depress valve is closed. Okay. IV 1 set comm to PTT, we're going to either go PTT or vox depending on how bad it gets and Vance?. IV 1. Go ahead. Inner hatch equalization valve, 1 of them open to normal please. Okay.

CAPCOM Challenger, Houston, with you at Hawaii for another 6 and 1/2.

SPACECRAFT Okay, Jerry, We got the valve clear and we're just releasing the airlock now.

CAPCOM Okay, good show.

SPACECRAFT The airlock pressure is fine, close the valve. Close the equalization valve. It's off. Okay, we're going to do a pressure integrity check here. For 2 minutes, I'm reading 5.7, you want to time 2 minutes, Vance. Oh, this watch works now. Now that we wound it. Yeah, I can start it if you wish. Go ahead. (garble) good status. Okay, disconnect waste areas, and
SPACECRAFT —— think by switching Bruce and Bob on comm modes as recommended, the third thing was Bob's foot restraint. Bob did not try out the airlock foot restraint, while he was pressurized mainly because they were kind of in a hurry to get in, but once he was unpressurized we made a an unpressurized comparison of boots in the airlock foot restraint. And I think Bob has a few words on how much bigger his toe is than Bruce's, in that, as far as the boots concerned. And after we get done eating, why we'll go ahead and have a debriefing. We intend to do it on intercom, we can do it on intercom B, if you wish, and we'll probably do it on our own little tape recorders too.

CAPCOM Understand, Vance.

SPACECRAFT Mary, this is Bob now. I'd like to just tell you about that (garble) problem because I've got (garble), get some somebody some lead time to work on it before the next EVA. It is a tongue hiest problem. It's very hard, almost impossible to wedge my toe far enough into the foot restraint to rotate the heel under the lock. The heel has a little bit of clearance not nearly as much Bruce's boot, but the toe is the significant problem, mine is wedged in there before I get the heel in contact. Bruce can lock his heels, and still have clearance under the toebar.

CAPCOM Roger we copy that, Bobby.

SPACECRAFT And that was unpressurized, so the pressure is just going to make it worse.

CAPCOM Understand that was unpressurized. And Challenger, Houston, was, payload was wondering how the AEM OPS went at 4+30?

SPACECRAFT Mary, you were cut out by some interference, please repeat.

CAPCOM Saying again, payloads was wondering how the AEM OPS went that was suppose to occur at 4+30 per the CAP?

SPACECRAFT Stand by. Yeah. Mary, Ron's changing batteries, on his headset, the wireless, and he'll be up with you in just a second.

CAPCOM Okay, we're 50 seconds LOS Hawaii, we'll drop you for a couple of minutes, and pick you up through TDRS. So we might want to wait until then.

SPACECRAFT Okay.

CAPCOM Challenger, Houston, back with you through TDRS.

SPACECRAFT Okay. Roger, we have you, Mary.
SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Challenger, Houston.

SPACECRAFT  Roger, Mary, wanted to give you some words on the AEM. I did not turn the lights, I did not turn the lights off until after the EVA. I noted before flight that was not listed in the EVA checklist and somehow it never got in there, so I didn't see it until after the EVA was over. I did turn the lights off, but I was unable to get data because we had EVA equipment stowed in front of the locker, and I was not ready to disturb it at that time. I do plan to take some data, within the next 1/2 hour or so. But the lights got off maybe an hour and 1/2 late.

CAPCOM  Copy that, and understand, the reason we asked was because it seemed to be buried in the CAP there.

SPACECRAFT  Exactly right, it's in the CAP, and not in the EVA checklist, and it just won't get seen that way.

CAPCOM  Roger, copy.

SPACECRAFT  Mary, if it had been in the checklist, I'm not sure Ron would have had time to do it or any of the rest of us, Ron was running the RMS probably about that time, and we we're really busy.

CAPCOM  Roger, understand. Challenger, Houston, have another question for Ron.

SPACECRAFT  Go ahead.

END OF TAPE
CAPCOM  Roger, understand. Challenger, Houston, have another question for Ron.

SPACECRAFT  Go ahead, Mary.

CAPCOM  Roger, you reported early in the EVA that that video record button was stuck and we were wondering whether the power cycle recovered it or whether you had to do something else to get it back.

SPACECRAFT  No, Mary, that turned out to be a configuration problem. We checked the configuration and we had to get the VTR play set to the monitor, somehow we changed tapes it got shut off and we found that and corrected the problem.

CAPCOM  Ok, thanks, understand that. Also, just a reminder for, on your setup to record ICOM B. That in order to get that, make sure on panel A1 that one of you voice record rotaries is selected to ICOM B.

SPACECRAFT  Ok, Mary, we copy that.

CAPCOM  Challenger, Houston, have a few question about the EVA today that we would like to get answered before we leave you alone for the evening.

SPACECRAFT  Ok, stand by, EVA crewmen are getting on the line.

CAPCOM  Ok, thanks, Vance.

SPACECRAFT  If you've got anything specifically for Bob, Mary, I can answer you right now.

CAPCOM  Ok, thanks, Bob, I sure do. With the secondary TPAD anomaly, they would like you to give them some more information on what happened when you were lowering that secondary TPAD.

SPACECRAFT  Ok, one of the times that fit into lock (garble) secondary TPAD in place was too long when I tried to rotate the TPAD back down and it all the other times cleared, except that one and it was catching on the TPAD itself. I tried several different times to sort of force it past, and I was relocking it and then trying to accelerate the TPAD down and then hopefully it would just kind of (garble). None of that worked and so I went and got the tools which are fortunately stowed right beside it there and twisted that particular time in until it just cleared the lip on the secondary TPAD and from that point, it rotated down.

CAPCOM  Roger, Bob, what tool did you use to rotate it?
SPACECRAFT    Say that again, Mary.

CAPCOM     Bob, they were wondering specifically what tool you used.

SPACECRAFT    There are 2 wenches stored on the door of the SESA, and they just happened to fit the size on the TPAD.

CAPCOM     Roger, copy, thanks. Also, they were wondering whether you had trouble with all the foot restraints in the bay, or whether it was one particular one.

SPACECRAFT    No, it was all of them. As soon as I could get into the MSR foot restraints, it was a little bit easier, no excuse me, not the MSR, the SSS foot restraints a little bit easier than the others, but the SESA foot restraint was almost impossible for me to get into. As was the Manipulator Foot Restraints. I don't think I would have been able to board the MFR, just between you and me, I didn't really get a chance to try it. When I deployed the stantion on the MFR, to put the tools onboard, I tried to get into the foot restraints down there and it was turning into a hassle and so I just stowed the, no I did finally get them in there, yes, I did and I did stow the tools from that position, but it was a real chore to get my boots in there.

CAPCOM     Copy that, thanks.

SPACECRAFT    And Mary, my initial impression was if it was paint problem, like we'd seen before, but when I tried to get into the unpainted foot restraints on the CPSA, I had the same problem I had on the SESA, so it's pretty much been around the ship, problem with pro-heights.

CAPCOM     Ok, we copy. Also Bob, we have a request that you give us a time hack when you start your debriefings so we'll know when to recover that debriefing off the ICOM.

SPACECRAFT    Ok, we'll do that.

CAPCOM     And that's all the debriefing we need from you now, and the only other question is for Bruce. Thanks a lot.

SPACECRAFT    Ok, Bruce is online right now.

CAPCOM     Evening, Bruce. We have 1 question for you --

SPACECRAFT    (garble) Mary, I'm on hardline. We still have a lot of noise but go ahead.

CAPCOM     Roger, we'd like to know on your force evaluation test, stand by.  

END OF TAPE
CAPCOM         Roger, we'd like to know on your force evaluation
test, stand by. Roger, Bruce, on the force evaluation test, we'd
like to know if there was any difference between position hold
and the brakes when you ran that test?

SPACECRAFT    Yeah, it felt to me like in the brake mode I could
definitely feel it drift (garble) from the position hold I
couldn't feel (garble).

CAPCOM         Challenger, Houston, Bruce, you're unreadable,
there is an awful lot of background noise in your transmission.

SPACECRAFT    Okay, Mary, what Bruce's comment was that in
position hold, well let me back up, in brakes on, he could feel a
discrete slip to the arm. He definitely felt the time when it
would go. In position hold, the point in which it slipped was
always called by Ron, looking at his digital display, seeing a
slip of greater than .2 degrees.

CAPCOM         Roger, copy.

SPACECRAFT    How's this, is this better?

CAPCOM         Much better, Bruce, you're loud and clear.

SPACECRAFT    Yeah, Mary, as far as stiffness goes, they seem
about the same, that is the arm itself deflected about the same,
it was just that in brake mode, when it let go, you could feel a
sort of a roughness or a vibration, as it moved, in fact, I was
very surprised that the surge of things you could feel. In the
MFR, out there at the MEB task, I could feel the vibrations,
 ARISING FROM Bob putting his 35 foot tending, soft tending tether
reel over the hook on the MMU FSS, and things like that. I
really hadn't thought I would be able to feel things like that.

CAPCOM         Roger, copy. I have one more question, for Bob on
the T-pad.

SPACECRAFT    Yeah, get it back to Bob here.

SPACECRAFT    Go ahead, Mary.

CAPCOM         Roger, the guys down here were wondering whether
you would consider the T-pad usable for the EVA tomorrow.

SPACECRAFT    Sure, I'd use it, I'd consider it usable. (garble)
would probably be usable, it was just a little bit of a clearance
problem, Mary, I think it's taken care of now.

CAPCOM         Okay, thanks, that sounds real good.
SPACECRAFT       Bruce points out that it's not tomorrow for the EVA, and in any case, we planned to use the primary T-pad on the SPAS docking, so the points is kind of a moot point I guess.
CAPCOM          Roger, copy.
SPACECRAFT    Mary, Challenger.
CAPCOM         Go ahead, Vance.
SPACECRAFT    Mary, now that we have our alignment, we know where to go back to -ZLV at 8+15, is there some particular reason for holding off till then? We noticed an - attitude we're currently in.
CAPCOM         We're checking. Challenger, Houston. Vance, there's a low g-period between 705 to 805 that they are trying to work around, and also GN&C would like the alignment data if you've got it. Challenger, Houston
SPACECRAFT    Yes.
CAPCOM         Roger, Vance, I'm sorry we had a comm drop out then, I'll repeat that the, between 705 and 805, there is a low g-period for the heat pipes experiment, and they are trying to work around that.
SPACECRAFT    Okay, well that's fine, we'll start at 8+15.
CAPCOM         And Vance, we're standing by to copy the alignment numbers when you've got them.
SPACECRAFT    Okay, Mary, if you're ready.
CAPCOM         Ready to copy.
SPACECRAFT    Okay, they were stars 42 and 25, angle area 0.01, and I'll read across all the delta X's. -0.09, -0.21, -0.01, all the delta Y's, +0.15, +0.03, -0.09, delta Z's, +0.01, -0.06, +0.14, execution time 4 days slash 06:51:55.
CAPCOM          Roger, we copy that.
SPACECRAFT    Houston, Challenger.
CAPCOM         Challenger Houston.
SPACECRAFT    Hey, Mary, do you want us to stay off that yaw sensor with the water dump and the fuel cell purge?
CAPCOM         Hoot, you're suppose to delay that yaw sensor activation at -

END OF TAPE
CAPCOM Roger, we copy that.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Hey Mary, do you want us to stay off of that yaw sensor with the water dump and the fuel cell purge?

CAPCOM Hoot, you're supposed to delay that yaw sensor activation, that's step 1, until 08 30 when you're back in the -ZLV.

SPACECRAFT Okay, great thanks.

CAPCOM Sure thing.

CAPCOM Challenger, Houston. Have one more presleep activity for you.

SPACECRAFT Okay, go ahead Mary.

CAPCOM Roger. Has to do with a 10.2 psi cabin maintenance. We'd like to get about 0.2 psi more pumped in, of the N2 pumped into the system so on MO 10 whiskey, we'd like you to take the 14.7 cabin reg inlet system 1 valve open to get the N2. And then also, we'd like you to verify, since we're not sure where it is, that the PPO2 hardware limits that's on alpha channel 34 upper caution warning limit is 3.20 psi, and that the PPO2 bravo, which is channel 42, is 3.10 psi and we'll TMBU the software. Over.

SPACECRAFT Okay, Mary. We copy that you wanted 34 to be 3.2. I think the other one you meant was 44 to be 3.1?

CAPCOM Your right, I'm wrong. Sorry about that. And that's a good readback.

SPACECRAFT Okay and then Mary the other part of it was, you want us to pump cabin press about .2 psi more. We're at 10.3 right now. Do you want us to run it to 10.5?

CAPCOM That's affirmative.

SPACECRAFT Okay, we'll do that and we'll do it by opening system 1 to flow into.

CAPCOM Okay, that's good.

SPACECRAFT (garble) to put in tape over there Ron?

CAPCOM Challenger, Houston. Say again.
This is Mission Control Houston at 4 days, 7 hours, 14 minutes mission elapsed time. The crew is going through the final preparations before their scheduled sleep period. They have completed a fuel cell purge and setting up the other Orbiter systems for the night. Flight Controllers here in Mission Control are reviewing any last minute items to give to the crew before their sleep period begins in an hour and 45 minutes. Things are very quiet here in the Mission Control Center after a very busy day of EVA activities. Very successful EVA in which quite a bit of work was done testing out the MMU's and many new tools to be added to the shuttles' capability. We have about 20 minutes remaining in this tracking data relay satellite pass, but we don't expect too much communication with the crew as the Flight Controllers are trying to leave them alone and let them go through and have their evening meal and make their other preparations for sleep tonight. This is Mission Control.

END OF TAPE
SPACECRAFT  Houston, this is Challenger, with a voice check on speaker mike.

CAPCOM  Challenger, Houston, got you loud and clear, how mu?

SPACECRAFT  You're loud and clear, Mary, thank you. Houston, this is Challenger, with a voice check on the middeck speaker mike.

CAPCOM  Got you loud and clear through the middeck speaker mike, how me?

SPACECRAFT  Houston, this is - Houston, this is Challenger, voice check, middeck speaker mike.

CAPCOM  Challenger, Houston, got you loud and clear on the middeck speaker mike, how me?

PAO  This is Mission Control Houston, 4 days, 7 days, 35 minutes Mission Elapsed Time, we have Loss of Signal with the Tracking Data Relay Satellite at the start of orbit #70. We'll rerequire in about 20 minutes through the Guam station, if there is any communication necessary with the crew. Most of the items have been finished up for the day. A few housekeeping type things, fuel cell purges, IMU alignments, that sort of thing being handled by the crew as they prepare and consume their evening meal. They're in the scheduled pre-sleep period and have about an hour and 20 minutes before they're due to go to sleep for the night. Shouldn't be much further communication with them this evening by Mission Control because most of the items have been read up to them already.

CAPCOM  Challenger, Houston, with you over Guam for 3 minutes.

SPACECRAFT  Roger, Houston, Challenger, loud and clear.

CAPCOM  Got you loud and clear too, Vance, and have a switch action we need done on panel A7.

SPACECRAFT  Ok, A7 we're listening.

CAPCOM  We'd like the MADS strain gage signal conditioner on.

SPACECRAFT  Signal conditioner on.

PAO  Mission Control Houston, 4 days, 8 hours, 0 minutes Mission Elapsed Time, we've had Loss Of Signal thru the Guam station, we'll pick up just a brief pass over Hawaii in about 8 minutes. The change of shift press conference for Flight
Director Harold Draughon which would have been held at 4:30 today has been canceled. Draughon was on duty at the same time as Flight Director Jon Cox, who ran the EVA activities, those being the primary activities of the day and all of that activity has been covered during Jon Cox's change of shift briefing which occurred just an hour and a half ago. So we will not have a 4:30 change of shift briefing with Harold Draughon.

CAPCOM Challenger, Houston, with you through Hawaii for 3 minutes.

SPACECRAFT Roger, Challenger. Houston, Challenger, we read you, how do you hear?

CAPCOM Challenger, Houston, have you loud and clear, how me?

SPACECRAFT Loud and clear.

SPACECRAFT Mary, we've pretty much put the craft in shape for the night period and folks are just finishing up eating and then we're going to start that debriefing.

CAPCOM Ok, we understand, Vance, and we'll just stand by for the dump times from you.

SPACECRAFT Since we have camera delta onboard, we assume you'll be sending up some kind of a procedure for us to work in the next day. Is that affirm?

CAPCOM That's affirmative, Vance, in fact, there's a rough copy of it up already.

SPACECRAFT Ok. And Mary, this place kind of looked like a bargain basement of a big store after a real good sale. We had things scattered all over the place. It's going to look pretty ship-shape now.

END OF TAPE
SPACECRAFT Mary, this thing kind of looked like a dark in space, of a big store after a real good sale. It had things scattered all over the place. It's starting to look pretty ship shape now.

CAPCOM Roger, copy.

PAO Mission Control Houston, standing by for acquisition through the tracking data relay satellite, repeating that the change of shift press conference with the Flight Director Harold Draughon, previously scheduled for 4:30 has been cancelled. All of the activities during the day were covered during the change of shift press conference, which occurred at 1:30 with Harold, with Jon Cox. Challenger is on orbit number 70. The crew is configuration the spacecraft for sleep period, they've already turned off a couple of the CRT's, just about all of the items change out of the lithium hydroxide canister, water dumps, fuel cell purges, IMU alignments and all of that, have been taken care of for the evening. Crew due to begin their scheduled sleep period in 41 minutes. So we may have little or no communication with them before they go to sleep. 4 days, 8 hours, 18 minutes. This is Mission Control Houston.

CAPCOM Challenger, Houston, back with you through TDRS now.

SPACECRAFT Okay. Hey, Houston, loud and clear.

CAPCOM Got you loud and clear too, Vance.

SPACECRAFT Houston, Challenger, with a radio check on the hand held mike, how do you read me?

CAPCOM Read you loud and clear, on the hand held mike, how me?

SPACECRAFT Okay, we got you the same, thanks, Mary.

CAPCOM Welcome, Hooter.

PAO Mission Control Houston, now approximately 1 1/2 million miles into the 4th flight of the Challenger. The crew is about to go to sleep, with approximately 1/2 hour left in their sleep shift, we would remind you that the change of shift briefing, originally scheduled for 4:30 p.m. has been cancelled. Here in the Mission Control Center, the planning team is going through their hand over procedure. Orbiter Challenger currently in a 156 by 149 nautical mile orbit. FIDO reports that all Continental United States landing sites look good for tomorrow. At 4 days, 8 hours, 32 minutes, this is Mission Control Houston.
PAO Mission Control Houston, Orbiter Challenger now approaching the equator in the beginning of orbit 71, GNC reports that the Orbiter is in a sleep attitude of -2LV. And three of the four CRT displays on the flight deck are powered off indicating the crew is just about ready to call it a day. Do have an announcement for the news media. NASA Administrator James N. Beggs, and Lewis Leahr, Chairman of the Board of the 3M Corporation, will hold a joint press conference at NASA Headquarters tomorrow, February 8th at 9:30 am central standard time to make an important announcement about a materials processing research program in space. Reporters at the Johnson Space Center, and the Kennedy Space Center, will be able to participate. It will be a two-way audio and a televised conference with questions and answers directed to headquarters in Washington, and or the 3M corporation, in St. Paul, Minnesota. At mission elapsed time, at 4 days, 8 hours, 55 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, I know it's sleep time now, I've got a couple of questions for you?

CAPCOM Challenger, Houston, I know it's sleep time, I've got a couple of notes for you.

END OF TAPE
CAPCOM     Challenger, I know it's sleep time now, I've got a couple of questions for you.

SPACECRAFT Challenger, were you calling?

CAPCOM         Roger, Hoot, I've got a couple of notes here for you if you can listen. Challenger, Houston, how do you read?
Challenger, Houston, how do you read?

SPACECRAFT   Hello, Houston, we're reading you, how do you read us?

CAPCOM    Loud and clear now, Hoot, we were dropping in and out of TDRS. I know it's bed time, but I've got a couple of notes for you. One, we're going to send up the camera changeout IFM note here over Guam, just in case somebodies up and wants to read it, otherwise you'll have it in the morning. And your state vector right now is good for about 3 revs, we're going to uplink a new vector for you in 1 or 2 revs that will last you till PLS tomorrow.

SPACECRAFT   Ok, good deal.

CAPCOM    Rog, and if you guys have finished debriefing the EVA, we'd like to get the ICOM B, debrief time so that we can look at that tonight.

SPACECRAFT  Ok, they are still debriefing and that's where it's going, it's going on ICOM B which, of course, is channel 2, but they haven't finished yet. How about if I give you buz when they're all done?

CAPCOM    Sounds good, we'll be here. And we're LOS TDRS in about 8 minutes and we'll have Guam in about 26 minutes at 9:30.

SPACECRAFT  Ok, and in case I forget to tell you, the MET that they started the debrief was 20:35, or wait a minute make that 08:35.

CAPCOM     Roger, copy, 08:35 for the start, thanks, and if we're not with you when your finished, you guys can go to bed, we can figure out where the end of it is by listening to the start.

SPACECRAFT  Ok, all right, we'll do it.

PAO        Mission Control Houston, repeating an earlier announcement, NASA Administrator James H. Beggs and Lewis Lair Chairman of the Board of the 3M Corporation, will hold a joint press conference at NASA Headquarters tomorrow February 8, at 9:30 am CST to make an important announcement about a materials processing research program in space. Reporters from the Johnson Space Center and the Kennedy Space Center, will be able to
participate via two-way audio during the televised conference with questions and answers directed to NASA Headquarters in Washington or to the 3M Corporation in St. Paul, Minnesota. At Mission Elapsed Time, 4 days, 9 hours, 23 minutes, this is Mission Control Houston.

PAO Mission Control Houston, the Orbiter Challenger now over South America on orbit 72. The new face at the Flight Directors post that you see on NASA select is Richard Pitts, one of the Flight Directors in training here at the Johnson Space Center who's working this shift with Flight Director Larry Bourgeois, come up to speed on some of the duties of a Flight Director. Pitts currently served in the GNC post here in Mission Control. Mission Elapsed Time 4 days, 10 hours, 17 minutes, this is Mission Control Houston.

END OF TAPE
...now are 17 minutes, this is Mission Control Houston.

SPACECRAFT Houston, Challenger.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead Vance.

SPACECRAFT Roger, this is just to let you know that you can find a debriefing on intercom B. We started it at 20:36 finished at 22:18, I guess we got a little carried away. Anyway, it's a fairly detailed debriefing on the -- our view of the EVA.

CAPCOM Roger, thanks very much, Vance, and have a good night's sleep.

CAPCOM you gave us?

SPACECRAFT Houston, Challenger.

CAPCOM Roger, Vance, we're those GMT times you gave me, 20:36 to 22:18?

SPACECRAFT Excuse me, I lost track of what time of day it is up here, that should have been 08:18 to 10:36, subtract 12 hours.

CAPCOM Roger, copy Vance, thanks a lot Have a good night sleep.

SPACECRAFT Okay. Houston, Challenger.

CAPCOM Go ahead Vance.

SPACECRAFT Sorry to bother you again, one more correction. I had to go back to the D board, it was 08:36 to 10:18.

CAPCOM Roger, thank you Vance. We had figured that out.

PAO Mission Control Houston, Orbiter Challenger now on orbit 72, and here in the Mission Control Center, the planning team is taking a look at some of the video from this morning's extra vehicular activity. All quiet aboard the spacecraft and in the control center. At Mission Elapsed Time, 4 days, 11 hours, 9 minutes, this is Mission Control Houston.

END OF TAPE
PAO At mission elapsed, 4 days, 11 hours, 9 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. The data processing systems officer reports that one of the CRT's on the flight deck of Challenger has been turned on, CRT #4. And flight director Richard Pitts and Larry Bourgeois verified that there have been no alarms or any reason that the crew might have awakened other than someone is just up prowling about. We're on orbit 73 and the mission elapsed time is 4 days, 11 hours, 49 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. The data processing systems officer reports that that CRT that came on, one of the crewmembers entered wake up time in it so it will be up and ready to go when they get up in the morning and then shut it back off. The is Mission Control, Houston.

END OF TAPE
PAO Mission Control, Houston. Orbiter Challenger now over the Indian subcontinent on orbit 74. We've entered one of those 40 minute TDRS to TDRS loss of signal periods where we'll travel without benefit of ground station coverage until we acquire signal through TDRS in about 40 minutes. All quiet aboard the Orbiter and in Mission Control. The mission summary and CAP updates for tomorrow are now being approved and put together and should be uplinked to the crew shortly. Awake time is in 2 hours, 56 minutes and mission elapsed time is 4 days, 14 hours, 3 minutes. This is Mission Control, Houston.

PAO Mission Control, Houston. We've got an update on an Orbiter sighting for the Houston area for tomorrow morning for those of you listening in the Houston area. The Orbiter will be visible at about 5:54 a.m. central time coming in out of the southwest at an azimuth of 219 degrees and a maximum elevation of 57 degrees. Again the pickup time for that Orbiter sighting is approximately 5:54 a.m. central at an azimuth of 219 degrees, or out of the southwest, and it will reach -- it's highest elevation will be 57 degrees and should be visible for about 4 and 1/2 minutes. At mission elapsed time, 4 days, 14 hours, 14 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. We've got yet another update on the Orbiter pass over Houston tomorrow morning, February 8. The numbers changed slightly. The time of closest approach is 5:55 a.m. CST, highest elevation 62 degrees, the azimuth 173 degrees so almost due south and that time that we would see it is 20 seconds after Orbiter sunrise or about 20 seconds after the sun strikes the vehicle so it should be nice and bright. Latest weather update, we're told here in Mission Control is locally, high, scattered clouds, if that. So it should be a good sighting opportunity. Those times again, 5:55 a.m. CST, elevation 62 degrees, azimuth 173 degrees. At mission elapsed time, 4 days, 15 hours, 2 minutes, this is Mission Control, Houston.

END OF TAPE
PAO    This is Mission Control, Houston. The change-of-
shift briefing scheduled for this morning with Flight Director
Larry Bourgeois has cancelled. The crew's sleep period is just
now expiring onboard Challenger. No indication of any CRT
activity on the vehicle yet. Doubtful that there'll be any
uplink communication from the control center, although we are
within range of TDRS. But following the pattern that the
CAPCOM's have established over the past several days, we would
expect the initial wakeup call to be over Yarragadee, which
occurs in about 24 min. Mission Elapsed Time is 4 days, 17 hr
even. Again, the change-of-shift briefing with Flight
Director Larry Bourgeois, scheduled for 12:30 a.m. Central
Standard Time is cancelled.

PAO    This is Mission Control, Houston. CRT number 1.
the cathode ray display directly in front of the commander's
position in the flightdeck has been activated, indicating that at
least someone's awake onboard the flightdeck of Challenger.
Mission Elapsed Time, 4 days, 17 hr, 2 min, this is Mission
Control, Houston.

PAO    This is Mission Control, Houston. We're out of
range of the TDRS satellite now, and we'll acquire through
Yarragadee in 13 min. As expected, no dialog even though there
are indications that the crew's awake, and they're moving around
going about their business of getting ready for the day's
activities as shown by some data reviewing activity on the
cathode ray tube displays in the flightdeck. Handover has
occurred in the Mission Control Center. Flight Director Randy
Stone and the Orbit 2 team of flight controllers has inherited
responsibility for the mission from Larry Bourgeois on the
planning team. The change-of-shift debriefing makes the point of
the Orbiter being remarkably free of systems problems. The other
events of this mission, perhaps, overshadowing the fact that the
Challenger is providing a rock solid performance during this
flight, and repeatedly as the flight director went around the
room to get status reports from the individual flight
controllers, he was advised that no system problems exist in the
various specialties represented here in the control center. So
Challenger providing yeoman service to the crew of Mission 41B.
We'll acquire signal, voice only, through Yarragadee in 12 min.
The duration of that Yarragadee AOS will be about 7 min, at
Mission Elapsed Time, 4 days, 17 hr, 13 min. This is Mission
Control, Houston.

END OF TAPE
Wake up Music

CAPCOM  Good morning, Challenger.

SPACECRAFT  Good morning Houston, things going well up here. How down there?

CAPCOM  Roger, good morning, Ron. John and I are standing here. John's got a shirt on that says NCA&T State University and I've got a hat on that says A&T Aggies.

SPACECRAFT  Hey fantastic. I thought I recognized that music. The words were a little strange but the melody came through.

CAPCOM  Good.

SPACECRAFT  Hey that's great stuff.

CAPCOM  Roger that, second half of that was "Southern to the Top." And Challenger, Houston, just a reminder in case you haven't got your CAP updated yet. We've got a maneuver to an IMU align here in about 8 minutes from now if you could check that.

SPACECRAFT  Okay Guy, we'll have that set up for (garble) maneuver.

CAPCOM  Roger, thank you.

PAO  This is Mission Control, Houston. We're at LOS Yarragadee and passing through a brief gap in coverage. A minute and a half before we pick up voice and data through Orroral and we'll have Orroral for about 4 and 1/2 minutes. Wake up calls were the North Carolina A&T University alma mater of which Mission Specialist Ron McNair is an alumnus; and "Southern to the Top", the fight song from the University of Southern Mississippi, the alma mater of Mission Specialist Bob Stewart. Mission elapsed time is 4 days, 17 hours, 32 minutes. We are about a half a minute away from LOS, this is Mission Control, Houston.

CAPCOM  Challenger, Houston, we're going LOS here at Orroral in 30 seconds. We'll see you TDRS at 17 plus 54, 15 minutes.

END OF TAPE
CAPCOM    -- 30 sec. We'll see you TDRS at 17 plus 54, 15 min.

PAO     This is Mission Control, Houston. Got some
downlink television due during this next TDRS pass. That'll
occur at Mission Elapsed Time 4 days, 17 hr, 58 min, translati:
ing into approximately 12:58 a.m. Central Standard Time. It'll be
payload bay scenes of the Mass Spectrometer in the payload bay.
When Mission Specialist Bruce McCandless did some repairs on that
unit during yesterday's EVA, he effectively got it working again,
but there is apparently some sensor damage in there that makes it
impossible for the ground payload's people to tell when that
spectrometer is swivelling, so they're going to look at some TV
of it, watch it swivel, and then correlate data to what they're
able to see visually occurring with that experiment. That
downlink TV, again, due at Mission Elapsed Time 4 days, 17 hr, 58
min, or 12:58 a.m. Central Standard Time. Presently, Mission
Elapsed Time 4 days, 17 hr, 46 min. We'll have acquisition
through TDRS in less than 8 min. This is Mission Control,
Houston.

PAO     This is Mission Control, Houston. We're just
seconds away from acquisition through TDRS, and the downlink
TV will probably very brief. It's just to give the
payload's people an opportunity to position the Mass Spectrometer
swivel mechanism, and we should have a blockage of the Ku-band
antenna fairly early to the Orbiter's attitude, so it should be a
fairly brief TV downlink. We'll get voice momentarily through
TDRS. Mission Elapsed Time, 4 days, 17 hr, 55 min. This is
Mission Control, Houston.

CAPCOM    Challenger, Houston is with you through TDRS, and I
have two things for you.

PAO     This is Mission Control, Houston. Challenger right
now is pointed for an IMU alignment, navigational aid alignment
that's looking at a couple of specific stars, and at this
pointing angle. The satellite is only about, between 12 and 15
deg off the nose of the vehicle, which is not a very good look
angle for the Ku-band antenna mounted on the forward starboard
side of the payload bay doors, and accordingly, we're just not
getting a good forward link right now, and this position should
improve gradually here, and we should have voice before much
longer. Mission Elapsed Time, 4 days, 17 hr, 58 min, this is
Mission Control, Houston.

CAPCOM    Challenger, Houston. Radio check.

PAO     This is Mission Control, Houston. We're still
having that pointing problem. The --
CAPCOM Challenger, Houston is with you through MILA Bermuda for 12 min.

CAPCOM Challenger, Houston is with you through MILA Bermuda for 12 min.

SPACECRAFT Roger, Houston. We're working with the last marks right now.

CAPCOM Roger, and Vance, we'd like ya'll to do two things for us. One, we'd like you to turn off the yaw sensor, please, and secondly, just for your information, INCO is taking camera alpha to do some mass spec positioning.

SPACECRAFT Okay. Yaw sensor off, and roger, camera alpha.

SPACECRAFT And, John, was -- in the CAP where it says check yaw sensor. Does that mean turn the yaw sensor off?

CAPCOM Roger. It does, Hooter, and we'll make it say yaw sensor off in future updates.

SPACECRAFT Okay. All right, cause we looked at that, and we had turned it on last night, and we assumed that check yaw sensor means it's still going, so we --

END OF TAPE
... check yaw sensor. Does that mean turn the yaw sensor off?

CAPCOM  Roger, it does, Hooter, and we'll make it say yaw sensor off in future updates.

SPACECRAFT  Okay, alright because we looked at that and we had turned it on last night and we assumed that check yaw sensor means it's still going so we had checked it still going. And I guess the printed copy of the CAP had the same sort of terminology so check or turn yaw sensor off would probably be a better way.

CAPCOM  Roger, I understand. I made the same comment when I came in this morning.

SPACECRAFT  Must be great minds working away.

CAPCOM  Roger.

CAPCOM  Challenger, Houston, if you could turn the forward payload bay lights on for us, please.

SPACECRAFT  Okay John, we copy that.

PAO  This is Mission Control, Houston. The payload bay lights or flood lights will now be coming on to facilitate a view of the mass spectrometer on the shuttle pallet satellite so that the payloads officers can do some positioning. Mass spectrometer is moving in the center of the screen there. This is Mission Control, Houston, the payloads officer reports that that motion we witnessed early in the TV was the positioning function and that the mass spectrometer is now properly positioned for the data take that they wish to accomplish.

CAPCOM  Challenger, Houston, I have something I want you to do, reference your PPO2 message when you have a minute.

SPACECRAFT  Okay, go ahead John.

CAPCOM  Roger, the cabin PPO2 has been running slightly high during the 10.2 Ops so we would like to shut off the O2 flow into the cabin from the bleed orifice until the PPO2 gets back down to normal around 2.7 psi. To do that, the switch you have to do is down on MO32 mike and on that panel, it's the LEHO2 toggle valve #5 to close.

SPACECRAFT  Okay John, that's complete.

SPACECRAFT  We can try that. Increase the respiration rates up here too, John.
CAPCOM    Roger that, Vance.

SPACECRAFT Houston, Challenger.

CAPCOM    Roger, go ahead Vance.

SPACECRAFT Okay, performed another star count, star 12. I can read you some bias numbers, if you'd like.

CAPCOM    Okay, ready to listen.

SPACECRAFT .44, .42, .59, .46, .55, .81. Over.

CAPCOM    Roger, we copy, thanks a lot, Vance.

SPACECRAFT And we had that star until 18 after the hour. We were to start the maneuver at 10 after. The two were incompatible since we really didn't get started til after the IMU align. So anyway, the maneuver was a little late.

CAPCOM    Roger, and that's okay, Vance. Looked good to us.

SPACECRAFT And I took down the COAS, checked the bottom of it, and the mounting, reinstalled it and I didn't notice any ...

CAPCOM    Okay, understand, you didn't notice anything and Vance if you have a second and can give us the IMU align data, we would take it from you.

SPACECRAFT Okay, stars 12 and 31, angular error .02; delta X going across -.01, -.16, +.01; delta y +.19, +.01, +.07, delta Z +.12, -.08, -.11; execution time 4/17:51:10.

CAPCOM    Roger, we have all the data and we're finished with the payload bay now if someone wants to go ahead and turn those lights off there. That's okay with us.

END OF TAPE
CAPCOM Roger, we have all the data and we're finished with the payload bay now if someone wants to go ahead and turn those lights off there. That's okay with us.

SPACECRAFT Okay, I'll turn them off.

CAPCOM Challenger, Houston, I have a message for Bruce.

SPACECRAFT Okay John.

CAPCOM Roger, the EVA folks want you to know that they see the MU batteries fully charged and you're go to continue.

SPACECRAFT Okay, we got the airlock all buttoned up right now so when we get the airlock open, we'll check the air meters also and then shift over charging the MMU batteries. But it's a good call, thank you sir.

CAPCOM Roger and you can do it at your convenience, Bruce.

SPACECRAFT Thank you.

CAPCOM Challenger, Houston, I hate to bother you again. But if somebody can give us a SPEC 1 on a GNC machine for variable parameter, we'd appreciate it.

SPACECRAFT Okay Houston, you have it, CRT1.

CAPCOM Thanks a lot Vance. And Challenger, Houston, the CRT is yours, #1, thanks a lot.

SPACECRAFT Roger. Hey Houston, Challenger, are you still with us?

CAPCOM Roger, go ahead, Bruce.

SPACECRAFT John, one of our communications problems seems to be that the middeck audio center is virtually useless from an ICOM standpoint. Lots of noise and when I'm hooked in there with the wireless comm unit, it's virtually, it's impossible to read you guys. What we'd like to suggest later on today if you agree, is reconfiguring the teleprinter so that the teleprinter runs off that middeck station. We can recieve you all very nicely on the speaker box and things like that and if you concur, we would rerig the teleprinter later on today and ask you for test a message. And if that works out, that would restore us to 4 active, well, 4 usable audio centers. That is the 4 up here in the flight deck. Right now, we're running 3 wireless comm units on one splitter box up here, then two singles, over.
CAPCOM Roger, we copy all that Bruce and we'll have INCO look at it and get back to you later today on that.

SPACECRAFT Okay, mighty fine.

CAPCOM Roger, sounds like a good idea that might work. We'll get back to you.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Yes, John, I can give you guys an update on that Cinema 360, footage yesterday that we took during the EVA.

CAPCOM Roger, we're ready to copy, Ron.

SPACECRAFT Okay, we initially rolled about 45 seconds of MF -- Bruce on the end of the MPR, this was sort of over the port longeron at the time. We ran out that footage just to be sure that the dome worked and the camera worked, that we're in good configuration so that when we're ready to really trim the prime shot, we wouldn't have problems starting the system. It worked fine then. The next time we tried it, we ran about 3 minutes worth. This was Bruce essentially on top of the GAS can with the Cinema 360 and we ... on the MPR again. And we got some very nice footage of him passing the GAS canister containing the MPR. So totally, we got about 4 minutes worth. All of it was MPR and we could -- also probably Bob at the port MMU was in the field of view as well. Over.

CAPCOM Roger, we copied all of that Ron, thanks a lot.

SPACECRAFT Okay, and I thank you guys for that, that wake up music this morning and the A&T coverage, that's a great place and I appreciate that.

CAPCOM Roger that, Ron, we enjoyed doing it for you.

CAPCOM Challenger, Houston, we're going LOS. TDRS in about a minute, we'll see you at Yarragadee at 18 plus 59 in about 13 minutes.

SPACECRAFT Okay John, we'll talk to you there.

END OF TAPE
CAPCOM Challenger, Houston. We're going LOS TDRS in about a min. We'll see you at Yarragadee at 18 plus 59, in about 13 min.

SPACECRAFT Okay, John. We'll talk to you there.

PAO This is Mission Control, Houston. We're LOS through the TDRS system. We'll pick up Yarragadee in -- we'll pick up Yarragadee in about 10 min, and that'll be a fairly long AOS through Yarragadee of a little over 8 min. Mission Elapsed Time, 4 days, 18 hr, 49 min. This is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through Yarragadee for 8 min. And Challenger, if you would prefer to call us the MMU temp data down instead of loading the PCCMU, you can.

SPACECRAFT It's already loaded, John.

CAPCOM That's fine. We'll take it on the PCCMU.

CAPCOM Challenger, Houston. We're going LOS here at Orroral in a minute. We'll see you TDRS at 19 plus 31.

SPACECRAFT Okay, John, and we've been having breakfast here. We just had an interesting pass against Australia, a fabulous view of the terrain here.

CAPCOM Roger that. Looking forward to maybe seeing some of the pictures you'll are taking passing Australia at this time of the day.

SPACECRAFT Right. We're hoping we can get back for a ground -- ground THRIFT check.

CAPCOM Roger that.

CAPCOM Challenger, Houston's with you through TDRS.

SPACECRAFT Roger, Houston. We're reading you loud and clear.

CAPCOM Roger, and you're coming through loud and clear.

SPACECRAFT Actually, loud with a mouthful of dried apricots.

CAPCOM We thought that.

CAPCOM Challenger, Houston. If Vance or Hoot has a minute, I have a question for them.

SPACECRAFT Go ahead, John, Hoot's listening.
CAPCOM             Roger.  Hoot, just wanted to make sure if you got
the note on the change of the value of C2 that would go in the
deorbit prep book on page 7-12.

SPACECRAFT        We're getting a lot of static.

SPACECRAFT        Houston, Challenger.

CAPCOM             Roger.  Go ahead, Vance.

SPACECRAFT        Yeah, John, we're getting a lot of noise, and we
missed your note last time -- something about page 7-12 in
deorbit prep.

CAPCOM             That's affirmative.  We just wanted to make sure
that you got the change that changes the value of C2 from a minus
.62 to a minus .60.

SPACECRAFT        Okay.  That's affirmative, John.

CAPCOM             Understand, you did get the change.

SPACECRAFT        Roger.  That's affirmative.

CAPCOM             Okay.  Thanks a lot, Vance.

CAPCOM             Challenger, Houston.  The EVA folks have their MMU
data.  Thanks a lot.  You have a go to load formats 116 and 179.

SPACECRAFT        Okay, John.  We'll go back to 116 and 179.

CAPCOM             Roger that, and while you're doing that, Hooter,
right there on that SPEC, you may just check that the PDI decom
FDA-4 is enabled.

SPACECRAFT        (Garble).

CAPCOM             Challenger, Houston.  Also, another note for you,
the dump --

END OF TAPE
CAPCOM  EA 4 is enabled. Challenger, Houston, also another note for you. The dump nozzle temps look real good to us right now and you're go to start the supply water dump. Challenger, Houston, radio check.

SPACECRAFT  You're loud and clear, Houston.

CAPCOM  Roger, did you copy our transmission that the dump nozzle temp looks good to us now, you can go ahead and start the supply water dump?

SPACECRAFT  Yes, John, we copy that and Hoot's getting it.

CAPCOM  Okay.

SPACECRAFT  Houston, this is Challenger, water supply (garble) we got that nozzle too warm and the valve is binding.

CAPCOM  Hoot, you're going to have to repeat that, you're coming through garbled to us.

SPACECRAFT  John, what Hoot said is that the dump now appears to be not opened. The talkback is barberpole on (garble) R12. The talkback is closed and we're wondering if maybe the nozzle is too hot and was binding.

CAPCOM  Stand by 1, Ron, and I'll get you an answer.

PAO  This is Mission Control Houston, we're about a third of the way through this TDRS pass. The discussion about the water temp nozzle has to do with the valve nozzle through which water is jettisoned down the water dump. Activities on the fuel cells use hydrogen and oxygen passing across a membrane to produce electricity, and water is produced as a byproduct of that function. The production of water is to the extent that it exceeds the storage capability onboard the vehicle and, accordingly, it must be jettisoned. And when it's jettisoned it's sent out of the vehicle through a T-shaped nozzle, it's T-shaped to ....

CAPCOM  Challenger, Houston, we've looked at the data with EECOM and PAYLOADS and we understand why you couldn't get the valve open. Because the heater was off. You can delay the water dump, we'd like you to go ahead and delay it and start the water dump at 20 plus 15 so that PAYLOADS can get their last MOMS data take.

SPACECRAFT  Okay, John, we understand, start the water dump at 20: 15.

CAPCOM  Roger, that.
PAO To continue, that water nozzle...

SPACECRAFT (garble)

CAPCOM Roger.

SPACECRAFT The reason the heater is off is that we just turned it off and the situation is that we tried to dump and the nozzle temperature was 190. And then when we tried to dump, the nozzle valve would not open. We figured it might be just too hot since the temperature just needs to be over 100 to do that dump. We thought that the valve might be binding due to being too hot; therefore, we turned the heaters off, that's why you saw the data with the heaters off.

CAPCOM Roger, understand that Bob and just clarify that you initially tried to open the valve with the heater on.

SPACECRAFT That's affirmative and we'll try it again right now, if you'd like to watch.

CAPCOM Okay, Bob, we'll wait til this MOMS data take is over and at 20 plus 15 when we start the water dump, we'll do that activity with you.

SPACECRAFT Okay, John.

PAO This is Mission Control Houston. To continue, that nozzle is T-shaped to facilitate the jettisoning of water in the opposite direction because if it was jettisoned only one way that would constitute thrust and would have an effect on the vehicle's attitude. So by jettisoning it out the opposite ends of a T-shape nozzle, the thrust effect cancels each other out. But that nozzle's also heated to protect against freezing in the extreme cold of space where temperatures routinely reach 100 degrees....

END OF TAPE
PAO  - the thrust effect cancels each other out, but that nozzle's also heated to protect against freezing in the extreme cold of space where temperatures routinely reach 100 deg below 0 deg F. When, of course, that nozzle freezes, why it prevents water from passing through it, so that nozzle has to be heated, and the discussion now is about the possibility there's some blockage on that nozzle since they apparently tried to dump water through it with the heaters on and failed. Assumed then, that the temperatures were extremely high to the extent that it caused binding in that nozzle, then turned the heaters off to see if the cooling temperatures would facilite the water flow, but since that water dump's going to get in the way of a data take now in the payload's world, why, we'll postpone that water dump until later on, and that subject will be readdressed. Right now, Mission Elapsed Time is 4 days, 19 hr, 50 min, and we have another half an hour or more remaining on this TDRS pass. This is Mission Control, Houston.

CAPCOM  Challenger, Houston. I have a heat pipe and mass spec flight note, when you're ready to copy.

SPACECRAFT  Okay, John, we're ready to copy.

CAPCOM  Okay, reference the heat pipe. Earlier today, we told you in a teleprinter message to delete the heat pipe deact. We don't want you to listen to our teleprinter message. Instead, we want you to go ahead and take -- perform the heat pipe deact at the nominal time, which is 4 days, 20 hr, plus 00 min, and this occurred because, as we look back over our telemetry playback of the attempt to reset the heat pipe from the ground, that our experiment did not restart. So we'd appreciate it if you'd do that for us.

SPACECRAFT  Okay. We copy that, John. We'll deactivate the heat pipe at 4 days, 20 hr.

CAPCOM  Roger that, and also, on page 3-11 of the payload OPS checklist. When you're running the glow 1 program, number 7, at the end there, when you're on that page, let me know, on page 3-12.

SPACECRAFT  Okay. Stand by just a second. Okay, John, I'm on 3-11 looking at mass spec program 7.

CAPCOM  Roger, and over at the end of the procedure on page 3-12, there where it says "when Orbiter has pitched to 360 deg, go to step 3", delete that there. Delete that step, but go ahead after then you've done the glow 2 program over on page 3-13 though, retain that step, go to step 3.
SPACECRAFT    Okay. We copy that, John. Up on page 3-12, delete the note about when the Orbiter is pitch 360, go to step 3. We'll go on into glow 2, and we will perform that step when we get to the end of glow 2 on page 3-13.

CAPCOM        Roger. Good readback, Hooter.

CAPCOM        Challenger, Houston. I have a flight note, reference the mass spec activation time when somebody's ready.

SPACECRAFT   Stand by just one minute, John.

CAPCOM        Roger that.

SPACECRAFT   Okay, John (garble).

CAPCOM        We're not reading you, Ron. You're coming through very scratchy.

SPACECRAFT   Okay, John, that was Hoot transmitting. How are you reading me?

CAPCOM        I'm reading you loud and clear, Ron.

SPACECRAFT   Okay, John, this is Hoot again. How are you reading me?

CAPCOM        Reading you loud and clear now, Hoot.

SPACECRAFT   We're ready.

CAPCOM        Roger. Hoot, what we'd like to do here is make sure we get some things started on time, and there are a few errors in your CAP. First of all, we want you to start the mass spec activation for the glow 1 sequence at 20 plus 10.

SPACECRAFT   Okay. We copy, start the mass spec activation for glow 1 at 20:10.

CAPCOM        Roger, and then the start the yaw sensor test at 21 plus 0.

END OF TAPE
CAPCOM ... mass spec activation for the glow 1 sequence at 20 plus 10.

SPACECRAFT Okay, we copy. Start the mass spec activation for glow 1 at 20:10.

CAPCOM Roger and then start the yaw sensor test at 21 plus 00.

SPACECRAFT Okay, yaw sensor at 21:00.

CAPCOM Right and finally, maneuver to -ZSI at 21 plus 33 per the CAP. And Hoot, the only reason we're giving you a couple of changes there is because it's critical to do this sequence on time. Any delay in executing these activities on time could prevent us and jeopardize the solar cell calibration experiment.

SPACECRAFT Okay John, we copy that, thanks. On the yaw sensor, we did the positive yaw a couple of days ago, do we just do the negative yaw today?

CAPCOM If you'll stand by, I'll get an answer from payloads for you. Challenger, Houston, Hoot, what we did the other day was an added test. We'd like you go ahead and do the full test today.

SPACECRAFT Okay, we copy that John, we'll do the whole test on the yaw sensor.

CAPCOM Roger, thanks a lot, Hoot.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Roger, on that heat pipe deactivation, the SPEC 220 came up with a, in item 22, the heat pipe already off. Went in and did inadvertent item 23 and cannot cycle back to 22.

CAPCOM Roger, understand Ron. Payloads has been seeing that also and we'll look at it for you and get back to you.

SPACECRAFT Okay

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Hoot.

SPACECRAFT Yes John, it looks like (garble) direction, along side after the EVA, it wasn't quite all the way there, the way it looked out the window. Is that a fact, that you all got it squared away?
CAPCOM    Roger, Hoot. That was us.

SPACECRAFT (garble) you guys.

CAPCOM    Challenger, Houston. Ron, to get back to you on your heat pipe question. We would like to know currently whether your indication is showing your heat pipe power is on or off.

SPACECRAFT The power is on.

CAPCOM    Roger, copy, on, o n.

SPACECRAFT That's affirmative.

END OF TAPE
STSC-41-B AIR/GROUND TRANSCRIPT t27lj 039:09:15 2/8/84 PAGE 1

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Challenger, Houston.

SPACECRAFT Yes, John, we're in the midst of glow one right now and it's come up time for the water dump at 20:15. We don't really want to do that with mass spec going on, do we?

CAPCOM Hoot, payload says there's no problem with the water dump during mass spec.

SPACECRAFT Okay, we'll do the water dump during mass spec.

CAPCOM Challenger, Houston, we see the dump nozzle at temp. If you could go ahead and start the dump, we'd appreciate it. We'd just like to see it underway before we go LOS TDRS.

SPACECRAFT Okay John, I'm ready getting ready to call you and tell you that I can't open the dump valve.

CAPCOM Okay.

SPACECRAFT Yes, I've been holding that switch over there, John, and the talkback in the cockpit stays closed.

CAPCOM Okay, thank you. Challenger, Houston. If you'd go ahead and turn the dump valve nozzle heater switch to off and we'll think about it here and try to come up with a plan when we get to Yarragadee.

SPACECRAFT Okay John, nozzle heater's off.

CAPCOM Roger and see you at Yarragadee in 20 plus 33. We're going LOS in 2 minutes from TDRS.

SPACECRAFT Thank you, John. Hey John, out of curiosity, at 20 plus 00, did you (garble) power on or off?

CAPCOM Challenger, you were coming through a little garbled, repeat your transmission.

SPACECRAFT I was asking if that 20 plus 00, did you say heat pipe power on or off on your indications.

CAPCOM Roger, we were showing that the heat pipe power was on.

PAO This is Mission Control, Houston at 4 days, 20 hours, 34 minutes. Just seconds away from AOS through Yarragadee and Mission Control Team watching a replay of today's EVA activities presently. We'll have voice in a moment through Yarragadee.
CAPCOM  Challenger, Houston, we're with you through Yarragadee for 7 and 1/2 minutes.

SPACECRAFT  (garble)

CAPCOM  And be advised Challenger, we're going to wait til this TDRS pass when we can see some data to work a little troubleshooting procedure on the dump valve problem.

SPACECRAFT  Okay John, we copy that. Hey John, I didn't copy your earlier transmission as to whether you saw the heat pipe power on or off.  (garble)

CAPCOM  Roger Ron, we saw the heat pipe on with our data. And for your information, the heat pipe, in our estimation, is on and running. You can let it run until SPAS deactivation tomorrow and we saw this same type of phenomenon on STS-7, so no action on your part.

SPACECRAFT  Okay, okay thanks for the information. I believe I saw power off when it came up and we were beginning to wonder if the information I got on the CAP update was actually, that is deactivate that pushbutton (garble). ... on my part, thank you.

CAPCOM  Roger that.

SPACECRAFT  We seem to be looking straight down at Yarragadee.

CAPCOM  Roger that. It must be a beautiful sight.

END OF TAPE
SPACECRAFT  We seem to be looking straight down at Yarragadee.

CAPCOM    Roger that. It must be a beautiful sight.

SPACECRAFT It certainly is, John. Australia's looking a little dry this time of year.

CAPCOM    Roger. We know that.

SPACECRAFT (Garble) GAS pump C, execution of (garble) 20 plus 39.

CAPCOM    Roger. We copy that, Ron. Thanks a lot.

SPACECRAFT Houston, Challenger.

CAPCOM    Roger, go ahead, Challenger.

SPACECRAFT (Garble) do you want us to go right into glow 2?

CAPCOM    At the scheduled time is when we would like you to go into glow 2.

CAPCOM    Challenger, Houston. We're going to be going LOS here in 50 sec, and the glow 2 occurs at about 23 plus 45. The next item would be the yaw sensor.

SPACECRAFT Okay, John. We copy that.

CAPCOM    Challenger, Houston. We're with you at Orroral for a minute. We'll see you at TDRS at 21 plus 08.

SPACECRAFT Okay, John. We'll see you there.

PAO       This is Mission Control, Houston. We're moments away from acquisition of signal through TDRS, and during this TDRS pass, we'll have some downlink video of more payload operations and positioning of the spin table in the mass spectrometer and the - -

CAPCOM    Challenger, Houston is with you through TDRS.

SPACECRAFT Roger, Houston. Loud and clear.

CAPCOM    Roger, and you are loud and clear.

SPACECRAFT (Garble) Hey, John, and we got the yaw sensor activated at 21:00, and ran the maneuvers.

CAPCOM    Roger. Thanks a lot, Ron.
CAPCOM     Challenger, Houston. We have good downlink data now, and would like to get on with our supply water troubleshoot, if you're ready.

SPACECRAFT Houston, (garble) is just finishing up on the yaw sensor stuff. He'd like to be involved in that. Any chance you can wait 5 min.

CAPCOM     Roger. We'll wait for you, Vance. No problem, and we are sending you a new Orbiter state vector.

SPACECRAFT Houston, (garble).

CAPCOM     Roger. Go ahead. You're coming through a little scratchy.

SPACECRAFT John, the CAP shows us yaw sensor steps 1 through 3, which includes just the plus yaw. Was there an intention here to include the minus yaw?

CAPCOM     Stand by one, Hooter. I'll try to get you an answer.

CAPCOM     Hoot, we'd like you to just do the yaw sensor test as the CAP is written.

SPACECRAFT Okay. That's where we are.

CAPCOM     Roger that.

CAPCOM     Challenger, Houston. If you're done with the yaw sensor test and have some time to go ahead and start the supply water troubleshooting, let me know.

SPACECRAFT Okay, Hoot's getting set up for it now.

CAPCOM     Roger. Understand. We'll wait until you call us.

SPACECRAFT Okay, John, I'm ready to go on the water dump.

CAPCOM     Okay, Hoot, what we need to do is, first, take the tank C inlet to close.

SPACECRAFT Okay. Tank C inlet is closed.

CAPCOM     Right. Then we need to take the dump isol valve to closed and check the - -
CAPCOM: Take the tank C inlet to close.

SPACECRAFT: Okay, tank C inlet is closed.

CAPCOM: Right, then we need to take the dump isol valve to closed and check the talkback closed.

SPACECRAFT: Okay John, that's closed, talkback is closed.

CAPCOM: Okay now take the dump valve enable nozzle heater to on.

SPACECRAFT: Okay, that's on. I've got a closed talkback on the dump valve.

CAPCOM: Okay and now we'd like you to just take the dump valve and cycle the switch 4 to 5 times and don't wait for the nozzle temps to increase.

PAO: This is Mission Control, Houston. The EECOM reporting that troubleshooting procedures have been ineffective so far.

SPACECRAFT: (garble) 3 or 4 times and (garble).

CAPCOM: Hooter, we did not receive that transmission. It was all garbled, if you could repeat, please.

SPACECRAFT: How do you read me, John?

CAPCOM: Loud and clear.

SPACECRAFT: Hoot must have a bad wireless, he's checking it.

CAPCOM: Roger that.

SPACECRAFT: Okay John, (garble) do you read?

CAPCOM: Roger, give me a test count, Hoot, please.

SPACECRAFT: 1, 2, 3, 3, 2, 1, test up.

CAPCOM: Roger, Hoot. At the start of each of your last two transmissions, you've been garbled but then near the end, it cleared up. Hoot, if you could repeat what you saw with the dump valve when you cycled the switch, please.

SPACECRAFT: What I saw was, (garble).

CAPCOM: I'm sorry Hoot, but we didn't receive any of that
SPACECRAFT  John, Challenger.

CAPCOM  Roger, go ahead, Bruce.

SPACECRAFT  Have you got any word from INCO yet on whether we can try to reconfigure the teleprinter down to the middeck audio station? Over.

CAPCOM  Roger, we're working. You are go to do that.

SPACECRAFT  Okay, we're go to do that. Okay, we'll get into that in a couple of minutes. Maybe that will help the long term comm.

CAPCOM  Roger that. You're go to do that and we'll, of course, check it out before we go postsleep.

SPACECRAFT  Okay, we'll give you a call.

CAPCOM  Okay, and you're loud and clear.

SPACECRAFT  Okay, John, this is Hoot on Vance's wireless comm which sounds real nice.

CAPCOM  Roger that.

SPACECRAFT  Okay, John, what I did on that dump valve was I cycled it a whole bunch of times and held it in -- actually held the switch in the ARM position for about 4 to 5 seconds even and never saw the talkback change at all in there. Did that about 3 or 4 or 5 times.

CAPCOM  Roger, understand. Thank you very much. Okay, Hooter, to clean up our little troubleshooting, it looks like that valve's still closed. We'd like to go ahead and take the heater back to off and the dump isol back to open and you can leave the tank C inlet closed where it is.

SPACECRAFT  Okay, that's complete.

CAPCOM  Thanks a lot.

SPACECRAFT  John, we (garble). Power down, (garble).

CAPCOM  Roger, we are not reading you, Challenger, if you could repeat the last transmission, please.

SPACECRAFT  Okay.

CAPCOM  Challenger, Houston. I have an additional flight note as a followup to our dump valve stuck closed.
CAPCOM: And Challenger, Houston, be advised if you're reading me, we are NOT reading you.

END OF TAPE
CAPCOM And Challenger, Houston. Be advised, if you are reading me, we are not reading you.

SPACECRAFT Houston, Challenger. How you?

CAPCOM Roger. Loud and clear.

SPACECRAFT Okay, John, what I've tried, have been trying to say was we activated the yaw sensor at a time, I'll have to go back and get it, but right now, I'm unable to power the solar cell on. I have attempted twice and I want to report that I have a go to do it up to three times. I haven't tried the third time yet. Over.

CAPCOM Okay, we understand. I'll see if payloads has any ideas for you, Ron.

SPACECRAFT Okay. Thank you.

SPACECRAFT (Garble).

CAPCOM Challenger, Houston for Ron. If you can cycle the solar cell power one more time to on, we'd like to look at it.

SPACECRAFT Okay, John, no joy on the power.

CAPCOM Roger. Understand you tried it one more time, and you couldn't get it to stay on.

SPACECRAFT That's affirm. It never cycled from off. The asterisks remained on an item 20.

CAPCOM Roger, we copy that.

SPACECRAFT Houston, Challenger. Comm check. How do you hear us?

CAPCOM Roger. Loud and clear, Ron.

SPACECRAFT Okay, it looks like Bruce's configuration is getting these comm units back in order, so hopefully everybody will be loud and clear.

CAPCOM Challenger, Houston. If somebody is over by L1, I have a switch that we need to throw to start boiling some water with the FES.

SPACECRAFT Okay. Go ahead, John.

CAPCOM Okay, we need the, next to the red controller there, we need the out temperature to high, and we want to do that to start boiling some water. When you're in that
configuraiton, later on when you get to the EMU recharge, you can take that out temperature switch and put it back to normal when you turn off the FES.

SPACECRAFT Okay. We copy that, John. You want us to take radiator out temp to high now, and that'll get us using some water through the FES, and when we do the EMU recharge later on, we can take that back to normal when we turn the FES back off.

CAPCOM That's a good readback, Hoot.

SPACECRAFT Okay, and how are you reading me on the (garble) now?

CAPCOM Roger. Hoot, you're coming through scratchy, readable sometimes, and other times completely unreadable.

SPACECRAFT Okay. Well, we've just changed the comm configuration around a little bit here, and we'll see (garble).

SPACECRAFT Okay, John, looks like that comm configuration has taken care of my comm. Another note on the solar cell, the STS bus amp, the power bus amp did not change from the current 8 amps count on SPEC 219 when I did the solar power cycles. Over.

CAPCOM Roger, we copy that, Ron, and payloads has been saying down here that we don't think we're going to be able to get that experiment to run, so I don't think we have any further troubleshooting of the solar cell experiment.

SPACECRAFT Okay, John. Okay, John, were halfway to the solar attitude. Do you want us to stop that and go back to ZLV?

CAPCOM Roger. We're happy that you just continued to maneuver by the clock, Hooter, because we have good Ku coverage with these attitudes.

SPACECRAFT Okay, copy that, John. We'll do that.

SPACECRAFT Houston, this is Challenger. We think we're configured on the teleprinter with the middeck audio center. Wonder if you could send us a test message, please.

CAPCOM Roger. We'll do that, and maybe I could get everyone to give us a voice check just so we could tell how --

END OF TAPE
SPACECRAFT  Houston, this is Challenger, we think we're configured on the teleprinter with the middeck audio center, wonder if you can send us a test message, please.

CAPCOM  Roger, we'll do that and maybe I could get everyone to give us a voice check just so we could tell how the comm is working.

SPACECRAFT  Okay, CDR here, how do you read?

CAPCOM  Roger, loud and clear, Vance.

SPACECRAFT  Okay, PLT with a radio check, how do you read?

CAPCOM  Loud and clear, Hoot.

SPACECRAFT  MS1 radio check. How do you hear?

CAPCOM  Loud and clear, Ron.

SPACECRAFT  MS2 radio check.

CAPCOM  Roger, loud and clear, Bob.

SPACECRAFT  MS3 radio check.

CAPCOM  Roger loud and clear, the comm sounds real good and we won't be able to send you that teleprinter test message until Hawaii.

SPACECRAFT  Okay, thank you.

SPACECRAFT  I think we have it. Looks like we have a MOMS data take in progress. No, I see we have the experiment ops (garble). I was wondering about that.

CAPCOM  Roger. Challenger, Houston, we need to boil water for about an hour to get enough O engine tank bravo, so we'd appreciate it if you didn't start the EMU recharge for at least another hour.

SPACECRAFT  Okay, we copy that, Bruce says he'll hold off.

CAPCOM  Challenger, Houston, if somebody's at the back end of the flight deck, we need the TV power control to command and then INCO will be using camera alpha, if that's okay.

SPACECRAFT  Okay, that's in command.

CAPCOM  Thank you.

SPACECRAFT  Houston, Challenger.
CAPCOM    Roger, go ahead Vance.

SPACECRAFT  As you know, this morning we have time to work in an IFM to dump supply water through the waste water dump nozzle if you all wish to do that. It doesn't look like it's a difficult thing to do and it might be easier doing now than sometime when we're really loaded up.

CAPCOM    Challenger, Houston.  Vance, we understand that. That's a good idea but it would be a turnaround head to the Cape and we'd prefer not to do that and instead control it with the FES.

SPACECRAFT    Okay.

PAO    This is Mission Control Houston, live TV now showing the mass spectrometer on the shuttle pallet satellite. This picture for PAYLOADS to enable positioning of the spectrometer sensors.

SPACECRAFT    Houston, Challenger, over.

CAPCOM    Roger, go ahead, Bruce.

SPACECRAFT    Roger, 70 mm film status.  We have remaining 3 full magazines, all of the data back type plus the following partial loads, 52 exposures in one magazine, 46 exposures in another magazine and 115 exposures remaining in a third magazine, third magazine so in effect we have about 5 magazines left.

CAPCOM    Roger, we copy and thanks for the report, Bruce.

SPACECRAFT    You bet.

SPACECRAFT    John, I understood to delay that EMU maintenance charge, does that mean you're going to delay the rev 80 TV as well, what's the status on that?

CAPCOM    Stand by one and we'll work that, that's a good question.  Challenger, Houston, Ron I have an answer for your TV question.

SPACECRAFT    Okay, John, (garble)

CAPCOM    Roger, you are go for the TV over MILA of the EMU recharge and Bruce can go ahead and start his recharge at that point. If the timing doesn't work out that way, it is crew option as to whether or not you show TV at all on that pass.

SPACECRAFT    Okay, we copy that...
CAPCOM  Bruce can go ahead and start his recharge at that point. If the timing doesn't work out that way, it is crew option as to whether or not you show TV at all on that pass.

SPACECRAFT  Okay, we copy that.

CAPCOM  And just for your information, we wouldn't reschedule that activity later in the day.

SPACECRAFT  Okay, we copy, we're go and if there's any change, we'll let you know.

CAPCOM  Roger that.

PAO  This is Mission Control, Houston. That view looking over the port side wing of the Orbiter presently over Mozambique in south Africa on orbit, descending node of orbit 79. Orbiter now crossing the east coast of the southern tip of Africa across the Indian Ocean and approaching Madagascar. This photo from the alpha camera mounted on the forward port side bulkhead. And that is Madagascar passing underneath the Orbiter at this moment.

CAPCOM  Challenger, Houston, we'll be going LOS here in about 3 minutes and camera alpha is showing us a beautiful view of the Madagascar Island as we go by.

SPACECRAFT  Alright John, it's starting to cloud up there a little bit now.

CAPCOM  Roger that.

SPACECRAFT  Very north end, three rivers that flow into the ocean that are very very muddy leave big mud plumes, it's a little unusual from what you normally see.

CAPCOM  Roger. Challenger, Houston, as we go over the hill, just for your information, payloads says the mass spec data looks good for the glow 2 experiment. We'll see you at Yarragadee in about 9 minutes.

SPACECRAFT  Okay, we'll see you at Yarragadee, John, thanks.

PAO  This is Mission Control, Houston. The purpose of that TV pass was to enable the payloads officers to look at the mass spectrometer to see that it was positioned correctly. There's a data problem with that instrument that prohibits them from watching swivel motion and it's impossible for them to tell from instrumentation whether the machine is pointed properly for its data takes and, accordingly, the only way possible to verify their correct positioning of the instrument is through video. It appears we've lost the solar cell experiment. Mission
Specialist Ron McNair indicated that he wasn't able to transmit power to the solar cell experiment to activate it. Payloads asked him to cycle the switch, which he did, with no joy. And no workaround procedure available to recover that experiment and it, accordingly, must be considered failed. The flash evaporator system has been activated as a method of removing water from tank bravo. That tank is at 90% of capacity and there's no purging mechanism available since the nozzle is apparently frozen. The INCO, or the BECOM, suspects that there's some ice in the line on that purge system which prevents the water dump. The workaround plan is to leave the nozzle heater on and those nozzles are heated in order to facilitate water flow in the extreme cold of space. The hope is that with those nozzle heaters activated, that the heater will travel back along the conduit and thaw the ice blockage which is preventing that water dump from occurring. So in the absence of the ability to dump water ...
PAO ... conduit and thaw the ice blockage which is preventing that water dump from occurring. So, in the absence of the ability to dump water, the flash evaporator system's being used to remove water from tank bravo. The FES, of course, is the method by which a cooling of the vehicle's systems is achieved as a backup to the radiators in the payload bay doors. And at times when the payload bay's doors are closed or if there's some reason why heat radiation can't be effected through those instruments, the flash evaporator system is employed. Employment of that system at this time is exclusively as a mechanism to dump water from tank bravo. A weather briefing was conducted on the loop earlier today and there were no significant problems at any of the primary sites. Edwards, Kennedy, and Northrup are all acceptable landing sites if there's a need to deorbit and entry today. Northrup was declared unavailable earlier in the morning because of the expectation of high winds. Those winds never materialized, so Northrup is a valid recovery contingency site today, for contingency landings. We'll have acquisition of signal in 4 minutes through Yarragadee at mission elapsed time, 4 days, 22 hours, 5 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston's with you at Yarragadee for 7 and 1/2 minutes.

SPACECRAFT Okay Houston, you're loud and clear at Yarragadee.

CAPCOM Roger, you're loud and clear, also. And as we went over the hill, INCO was unable to command camera alpha off. If you could do that for us, we would appreciate it.

SPACECRAFT Okay John, we'll get that. It's off, John.

CAPCOM Challenger, Houston, and I have an item for you from EECOM when you're ready.

SPACECRAFT Okay, we're ready, go ahead.

CAPCOM Roger, at your convenience over the next 30 minutes or so, if you could do the 10.2 cabin maintenance procedure for us and flow nitrogen only.

SPACECRAFT Okay, we copy, within the next half hour, 10.2 cabin maintenance procedure and we'll flow nitrogen only.

CAPCOM Roger, good readback, Hooter. Challenger, Houston, we're going LOS here in 30 seconds. We'll see you at Hawaii at 22 plus 35. Enjoy your sunset over that beautiful Australian continent.

SPACECRAFT We agree with you John, it is one beautiful continent and we also think we had kind of a far away look at tropical cyclone "Willie" a couple of minutes ago.
CAPCOM    Roger, sounds good, we look forward to some of your pictures of it.

SPACECRAFT    ... even closer one later but took a couple of long distance shots.

PAO    Mission Control, Houston. We're LOS through Yarragadee on the ascending node of orbit 79. We will reacquire again through Hawaii in 16 minutes. And our next TV will be views of the airlock in middeck in the Orbiter and the recharge procedures of the extravehicular mobility units. That video is scheduled for mission elapsed time 4 days, 22 hours, 54 minutes which translates into 5:54 a.m CST. At mission elapsed time, 4 days, 22 hours, 19 minutes, this is Mission Control, Houston.

END OF TAPE
PAO That video is scheduled for Mission Elapsed Time, 4 days 22 hours 54 minutes, which translates into 5:54 a.m. Central Standard Time. At Mission Elapsed Time, 4 days 22 hours 19 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston's with you at Hawaii for 7 minutes.

SPACECRAFT Loud and clear, John.

SPACECRAFT Okay, John, we read you loud and clear. Let us know when you're ready (garble) and receiving TV.

CAPCOM Okay. Challenger, Houston, we had some trouble getting the link up here for Hawaii but we'll see you over Goldstone and MILA, hopefully, with TV.

SPACECRAFT Okay, John.

CAPCOM Challenger, Houston, be advised we have just shipped you a test teleprinter message that you can look at, Bruce.

SPACECRAFT Okay, we've got the light on but we're working on the TV right now. Do you have downlink?

CAPCOM Negative, we will not be able to get TV downlink here at Hawaii, Bruce, we didn't get it configured in time, we'll have to wait till Goldstone for the TV.

SPACECRAFT Okay, we will too.

PAO This is Mission Control, Houston, we're less than 8 minutes from Goldstone and we'll get some downlink TV at that site of the depressurization of the extravehicular mobility units going on in the middeck and the airlock.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Bruce.

SPACECRAFT Roger, all I got on the teleprinter is a full row of E's as the E as in an echo character followed by what looks like one each of the different characters the teleprinter can print and it's remaining in the high power mode.

CAPCOM Roger, understand, Bruce, that doesn't look like what we intended to send you. Challenger, Houston, we're going LOS here at Hawaii in 30 seconds and we'll try another teleprinter message with you over MILA.

SPACECRAFT Okay, John, we'll meet you. How long is this MILA
pass?

SPACECRAFT  Duration.

CAPCOM  Okay, the MILA pass is in about 12 minutes and it'll last for 7 minutes.

SPACECRAFT  Okay, thank you, talk to you there.

PAO  This is Mission Control, Houston. A picture of the middeck of Challenger with the airlock in the center.

CAPCOM  ...Houston, we're with you at TDRS.

SPACECRAFT  Okay, John, loud and clear through TDRS.

CAPCOM  Roger, and we're getting live TV with you now and it looks very good. Challenger, Houston, if someone is available there, if you could turn the teleprinter off and we will work the comm config after the TV pass.

SPACECRAFT  Okay, John.

SPACECRAFT  That teleprinter going off.

CAPCOM  Roger.

PAO  This is Mission Control, Houston. That's the spare EMU, extra vehicular mobility, EMU number 3, the extra on-orbit spare that's carried. That's astronaut Bruce McCandless with the portable life support system, PLSS, and he's getting ready to replace the LiOH cartridge canister in there, which scrubs the recirculated air of CO2.

CAPCOM  And Challenger, Houston, we're getting a real nice TV of Bruce changing out the LiOH canister.

END OF TAPE
PAO -- the recirculated air of CO2.

CAPCOM And Challenger, Houston. We're getting a real nice TV of Bruce changing out the LiOH canister.

SPACECRAFT Okay, John, glad to hear it.

PAO Mission Control, Houston. We've lost video, and we'll pick up through the Merritt Island Station in about 1 minute from now through MILA.

CAPCOM Challenger, Houston. We've lost the TV downlink for a few minutes until we come over MILA. Hoot, I have another flight note for you to try and troubleshoot the dump valve.

SPACECRAFT Okay, John. Ready to copy.

CAPCOM Okay, Hoot, what EECOM thinks now is that we may have some ice around the valve, so what he'd like to try is to take the supply water dump isol valve to close, check the talkback closed, then go ahead and take the dump valve enable nozzle heater to on, and just leave it on, wait until we get a high temp alert, and when you get the high temp alert, then try to open the valve. We're going to be increasing the high limit from 300 to 350 with a TMBU for you.

SPACECRAFT Okay, John. We copy all that, and ...

SPACECRAFT I've closed the isol valve, we'll turn on the dump enable nozzle heaters (garble) high temperature alert which you're going to send up to us.

CAPCOM Roger you got it, Hooter, and we're back with you live TV on the middeck.

SPACECRAFT Okay, good

SPACECRAFT Vance says that thing has a high (garble) at 300, John, and I probably didn't break it by letting it go to 200. Is that true?

CAPCOM That's affirmative, Hooter, and we're going to even raise it up to 350, and just to try and melt ice around the valve if that's the problem.

SPACECRAFT Okay, good. I'll go ahead and do that right now.

CAPCOM Roger that. Thanks a lot.

CAPCOM Challenger, Houston. We're really getting some very pretty pictures of you in the middeck, and just like you to know that Mr. Rousseau in building 5 saw you go over again this
morning, and you had quite a crowd of people who said you really looked pretty as you passed over our skyline.

SPACECRAFT    Well good. We're making a regular thing of it.
CAPCOM        Roger that.

SPACECRAFT    John, we noticed that the Cape weather has been looking good about every day when we pass over it.
CAPCOM        Roger that, Vance.

PAO           This is Mission Control, Houston. Bob Stewart just got the lubricating kit out which lubricates all the seals and interface points on the EMU to make sure they move freely and provide integrity and a good seal.

SPACECRAFT    And John, just out of curiosity, are you selecting your downlink scenes, or are you taking what I send you.

CAPCOM        We are taking what you send us, and if you have something else to send us, we'd like to look at it too.

SPACECRAFT    Can't get it all up at once. We'll save some for Hoot.

SPACECRAFT    I really don't.

PAO           Astronaut McCandless just was handed the EMU TV battery pack-- that trip provides TV for the helmet camera which he wears while on EVA.

CAPCOM        Challenger, Houston. We've just lost our TV downlink.

SPACECRAFT    Okay, John.

CAPCOM        Thank you for the time it takes to set that up. We enjoyed watching your activities for the past 10, 15 min.

SPACECRAFT    Glad to do it.

CAPCOM        Challenger, Houston. If you would be free to try the teleprinter message again at Ascension, I have a couple of switch configurations for you.

SPACECRAFT    Okay, we'll check (garble)

CAPCOM        Okay. We'll be at Ascension in about 10 min, and what we need you to do is take the -- 

END OF TAPE
CAPCOM       ...free to try the teleprinter message again at Ascension, I have a couple of switch configurations for you.

SPACECRAFT   Okay, we'll check (garble)

CAPCOM       Okay, we will be at Ascension in about 10 minutes and what we need you to do is take the air to ground 2 and make sure it's in TR on the teleprinter panel and make sure the air to ground 2 is either off or in receive on the other panels.

SPACECRAFT   Roger, John, that's affirmative.

CAPCOM       Thank you, Bruce.

SPACECRAFT   (garble) And John, I'd like to know, are there arm grapple procedures onboard?

CAPCOM       Stand by, Ron, I'll get you an answer. And Challenger, Houston, we currently have Ascension configured to send you a teleprinter test message at 23 plus 13.

SPACECRAFT   Okay, John, we copy, teleprinter 23:13. John, (garble) air sample.

SPACECRAFT   Houston, Challenger, how do you hear?

CAPCOM       Roger, loud and clear.

SPACECRAFT   Okay, as of -- another call, that air sample, simply open a bottle, hear a hiss and the procedures -- I just want to be certain as to how many of those we should take and just to be clear that that is in fact the proper procedure.

SPACECRAFT   John, I think we know that it's just one bottle at this time and simply consists of taking the cap off of the bottle, opening it, closing it and put the cap back on. Ron was wondering if there's a written procedure on that or if it's..

CAPCOM       Negative Vance, there is no written procedure, you have the correct procedure.

SPACECRAFT   Thank you.

CAPCOM       Challenger, Houston, Vance, just to follow up on your question, all you need to do now is take that air sample with that bottle now and then you can come back and take the final air sample bottle right before you do the repress.

SPACECRAFT   Okay understand, the final air sample is the part we repress back to 14.7 psi.

CAPCOM       Roger that, Vance.
STSB-41-B AIR/GROUND TRANSCRIPT t280j 039:12:05 2/8/84 PAGE 2

SPACECRAFT Roger, that's in the CAP. Rog, that's in the CAP isn't it, when we do that?
CAPCOM Yes sir, it is.
SPACECRAFT Okay, thank you.
CAPCOM Challenger, Houston, we're with you at Ascension and we're sending up the teleprinter message. Challenger, Houston, we have another check message up for you now if you could look at it on the teleprinter and tell us how it looks.
SPACECRAFT Okay, John, we'll get that.
SPACECRAFT Hey, John, when you called to turn the power switch off on the teleprinter, it got turned off and never got turned back on.
CAPCOM Okay, turn it on and we'll send it again.
SPACECRAFT Okay, it's turned back on.

PAO This is Mission Control Houston, Mission Elapsed Time, 4 days 23 hours 18 minutes. There's some discussion here in the control center concerning the SPAS, the shuttle pallet satellite, and the possibility that a couple of the SPAS failures may be thermally induced, the tilt table on the mass spectrometer has failed and we're unable to cycle power to the solar cell experiment.

END OF TAPE
PAO ... the tilt table on the mass spectrometer has failed and we're unable to cycle power to the solar cell experiment. Payloads officer indicates some curiosities of a notion that those failures might be related to overheating and we're looking now at a workaround which involves deactivating or powering down that whole SPAS experiment package and putting the ship in a cold attitude with the payload bay toward the deep space for an hour or two, perhaps an hour and half, to give the SPAS the opportunity to cool down and then see if that has any impact on the adequacy of those experiments. We still have 15 minutes remaining in this TDRS pass, at 4 days, 23 hours, 20 minutes. This is Mission Control, Houston.

CAPCOM Challenger, Houston, we believe you have another teleprinter message onboard.

SPACECRAFT Yes, John, we got the light. I'll see if we got any text.

CAPCOM Roger that.

SPACECRAFT I don't know John, did the quick brown fox jump over the lazy dog's back? Over.

CAPCOM Roger doger.

SPACECRAFT Okay, we got it. Three lines of good ...

CAPCOM And if you can confirm, Bruce, for us that it went back to low power.

SPACECRAFT It looks like we're in business. Thank you very much.

CAPCOM Roger that, Bruce. And just confirm for us that it did go back to low power.

SPACECRAFT Affirmative, the teleprinter did go back to low power.

CAPCOM Thanks a lot. INCO's real happy now.

CAPCOM Challenger, Houston, over TDRS here with you, EECOM is able to see your dump valve and we see the temperature is now up to 310 and he'd like you to go ahead and cycle the dump valve to-- or move it to open and see if we can get it to open up.

SPACECRAFT John, before you do that. We're doing the EMU water recharge, that's not going to affect the quantity gaging, is it?
CAPCOM    Negative. Negative, it will not, Bruce, we have the isol valve closed and we just want to see if we can make that dump valve open.

CAPCOM    Challenger, Houston for Hoot. Challenger, Houston, a question for Hoot.

SPACECRAFT John, Hoot's not on comm right now. We'll take a message for him.

CAPCOM    Okay, what we're trying to do, Ron, is continue to troubleshoot the supply water dump valve. We can give you the note if you want to give it to him.

SPACECRAFT Copy John. Stand by, Hoot's back on comm, he can take it alright.

CAPCOM    Okay.

SPACECRAFT Okay John, yes, I'm back with you.

CAPCOM    Okay Hooter, we'd like you to -- we see the temperature on the nozzle the last time we had data up to about 310. If you could take that dump valve and put it to open and see if we can get it to open, we'd appreciate it.

SPACECRAFT Hello Houston, Challenger.

CAPCOM    Roger, go ahead, Hoot.

SPACECRAFT Okay yes, John, I called that we were ready to listen and then I didn't hear anything. I think we lost you for a minute. What was that temperature you were calling for?

CAPCOM    Okay, our problem here is we've had some comm in and out with TDRS but we have good UHF for certain now with Botswana. Let me just start again. We saw the nozzle temperature last time we had data up to about 310 degrees and we'd like you to take the dump valve and put it to open to see if you can get it open.

END OF TAPE
CAPCOM: -- the nozzle temperature last time we had data up to about 310 degrees and we'd like you to take the dump valve and put it to open to see if you can get it open.

SPACECRAFT: Houston, Challenger.

CAPCOM: Roger, go ahead.

SPACECRAFT: Houston, Challenger.

CAPCOM: Challenger, Houston, we read you loud and clear, go ahead. Challenger, Houston, radio check, how do you read?

SPACECRAFT: Okay, John, I think I've got you back, how do you read us?

CAPCOM: Roger, you're coming through a little scratchy, Hoot, but did you copy that we'd like you to try to take the dump valve on open.

SPACECRAFT: Houston, Challenger, we hear you, can you hear us?

CAPCOM: Challenger, Houston, radio check, how do you read? Challenger, Houston, radio check, how do you read?

SPACECRAFT: Hello, Houston, Challenger, you're loud and clear, how about us?

CAPCOM: Okay, we've been having some comm problems in and out for the last 10 minutes. But Hoot, did you copy that we'd like you to go ahead and open the dump valve?

SPACECRAFT: Okay, I figured that's what you wanted. I've been trying it, John, let me go ahead and try it again maybe while you're watching. It has been showing me no response.

CAPCOM: Understand. We had just seen the nozzle temps up to about 310, so we thought we'd have you go ahead and try to open up when we had some TDRS data and we have good data now. So we'll be looking at it.

SPACECRAFT: I'm holding the switch open right now and I still have a closed talkback. And John, I may have missed it but at some point, did you have us crossover to use tank C to the SES?

CAPCOM: Hoot, no problem on opening the tank C inlet.

SPACECRAFT: Okay, that wasn't quite my question, John. What I see right now in the supply water panel is that we appear to be seating the SES out of tank C through the crossover valve because tank A and B outlets are both closed. Could you call that up and
(garble). Okay, John, disregard that last question. We got the answer onboard here.

CAPCOM Copy that, Hoot. Challenger, Houston, we're going over the hill in 30 seconds. Hooter, what we'd like you to do is when you finally get the high temp alarm as you go over the hill, we would like you to try it one more time to see if you can get the dump valve to open. If it doesn't, we want you to turn the heater off, take the dump valve to closed and take the isol valve to open.

SPACECRAFT Okay, I copy that and I'll do that, John.

CAPCOM We'll see you at Yarragadee at 23 plus 45.

SPACECRAFT Ok, see you at Yarragadee.

PAO This is Mission Control at Houston, we expect to talk to the crew through Yarragadee in about 7 minutes, there may be a configuration problem, however. The EMU, Extra-Vehicular Mobility Units that they've been working on are also equipped with UHF transmitters and the INCO sees from his data that one of those suits has the comm gear turned on. There is an antenna stowed presently in the airlock and that activated UHF circuit may have the effect of saturating the comm link and making it impossible for us to talk to the crew through Yarragadee. If that turns out to be the case, our next opportunity would be, to talk to them at Guam in 23 minutes. At Mission Elapsed Time 4 days, 23 hours, 39 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, with you at Yarragadee. Challenger, Houston, going LOS Yarragadee, we'll see you at Guam in 6 minutes.

END OF TAPE
CAPCOM Challenger, Houston going LOS Yarragadee. We'll see you at Guam in 6 min.

CAPCOM Challenger, Houston is with you at Guam for a short pass, 1 min.

SPACECRAFT Okay, John. Loud and clear. The dump valve switch did not work. Maybe I'll go back and switch the heater on and try it again once, but didn't work when I got the high temperature alarm on the thing.

CAPCOM You can -- okay, Hooter, you can try it again, let the temperature get down to about 200 deg, and when you cycle the switch the next time, take it to close, to open, back to close and open.

SPACECRAFT Okay. I'll try that.

CAPCOM Challenger, Houston. EVO and -- EVA and INCO believe we can fix our comm problem if you would go hardline on EMU 2.

CAPCOM Challenger, Houston. Radio check.

SPACECRAFT You're loud and clear, John.

CAPCOM Roger. Hoot, we have another minute here at Guam. We believe that we could improve our UHF comm problem if you would go hardline on EMU 2.

SPACECRAFT Right?

CAPCOM At your convenience. We're going LOS here at Guam in 50 sec, and we'll see you at Hawaii in 7 min.

SPACECRAFT that done.

CAPCOM Okay. Copy that, John. We'll see if we can't get

CAPCOM Challenger, Houston is with you at Hawaii for 7 min.

SPACECRAFT TDRS with the

CAPCOM playback will Roger that, and we're interested to know if that have voice on it.

SPACECRAFT Yes.

CAPCOM Thank you very much, Vance.
ST5-48-B AIR/GROUND TRANSCRIPT t283j 039:12:46 02/08/84 PAGE 2

SPACECRAFT Houston, Challenger.

CAPCOM Roger. Go ahead.

SPACECRAFT John, what you'll be getting, of course, in voice is the intercom, and is it true on TDRS then, that we will have no air to ground?

CAPCOM We won't have air to ground with you between Goldstone and MILA.

SPACECRAFT Copy, John. Thanks.

PAO This is Mission Control, Houston. This downlink video coming up is a VTR dump of --

CAPCOM Roger, a note for Hoot when he's ready to copy.

SPACECRAFT Ready to copy, John.

CAPCOM Okay, Hoot, EECOM has another idea he'd like to try with troubleshooting that dump valve. He'd like you to let the temperature cycle for 3 cycles between 200 deg and 350 deg. If no joy after period, we'd like to go ahead and turn the heater off, take the dump valve, put it to close, take the isol valve and open it.

SPACECRAFT Okay, John. I copied. We're going to let the temperature cycle 3 times between 200 and 350, and at the end of that if we haven't had any luck, we're going to leave the dump valve closed and the pump isol open.

CAPCOM That's affirmative, and turn the heater off.

SPACECRAFT Okay, yeah, and, of course, heater off.

CAPCOM That's a good readback, and we're going LOS here at Hawaii in 45 sec. We'll see you up TDRS with the dump.

SPACECRAFT Okay.

PAO Mission Control, Houston. It's 5 days, 0 hr, 18 min Mission Elapsed Time, and the upcoming dump of -- the upcoming dump will be of --

END OF TAPE
CAPCOM That's a good readback, and we're going LOS here at Hawaii in 45 seconds, we'll see you up TDRS with the dump.

SPACECRAFT Ok.

PAO Mission Control Houston, 5 days, 0 hours, 18 minutes Mission Elapsed Time. And the upcoming dump will be of video recorded onboard during EVA-1 yesterday. We just have a brief gap between Hawaii and TDRS coverage. That signal should be coming down soon.

SPACECRAFT Houston, Challenge, how do you hear.

CAPCOM Challenger, loud and clear.

SPACECRAFT Ok, just wanted to make sure we had you, here comes the dump and if we're ever running the recorder ahead, we'll give you some cabin scenes inbetween.

CAPCOM Roger, we copy, and Vance, I have a flight note that's --

SPACECRAFT (Garble)

SPACECRAFT Ok, thank you, thank you very much. We stopped to get your flight note.

CAPCOM Ok, Vance, it's going to change your CAP this afternoon, and we have a teleprinter coming up to you that will give you activities starting at 1:35, but I have something I need you to go ahead and get started with now so I'm going to voice it up to you.

SPACECRAFT We're holding the dump till you get it up.

CAPCOM Ok, we need to, after glow-2, we need you to maneuver to the -X local vertical, with the -Y velocity vector, target 2, body vector 2, micron equal to 90, DAP A-auto vern, and initiate track. And then deactivate the SPAS, and I'll give you the rationale later.

SPACECRAFT Ok, John, we can't hear you while we're dumping that, so we had to stop. Here it goes.

SPACECRAFT Ok, loud and clear.

SPACECRAFT Well, that may have been small step for Neal, but it's a heck of a big leap for me.

CAPCOM Roger, copy that Bruce.

SPACECRAFT Ok Bruce, we see you air borne.
SPACECRAFT  (Garble) Hey, great. And don't to forget to monitor, Bruce, your GN2 gages for about 60 --

SPACECRAFT  (Garble) good. He's right outside our window here, looks great.

SPACECRAFT  Attitude hold, ok. A going off and B coming on. Next.

SPACECRAFT  Back up A and B, and then, of course, then you check the stat (garble).

SPACECRAFT  Ok, the (garble) a -Y, I'm getting a little bit of a positive roll, +Y I get the opposite little negative roll. Here's Z, no particular pitch attitude, +Z (garble)

END OF TAPE
SPACECRAFT  (garble). Somebody bump me. Yeah, I bumped into Bob, I'm sorry. Okay, she (garble) good. How long till sunrise? (garble) Well, yes sir. (Garble) Yep. Okay, Bruce we have a good shot of the payload bay. Great, this is neat. Looks great, Bruce.

SPACECRAFT  Thank you, I'm trying to see what sort of land mass that is we're coming up. Looks like Florida, it is Florida. It's the Cape.

SPACECRAFT  Yeah, you're on the state side pass, Bruce.

SPACECRAFT  Ah I got to see if I can get a picture of this.

SPACECRAFT  You're not too far from Cuba as a matter of fact. And Houston, we had some helmet mounted TV on now.

CAPCOM  Roger, we got a little bit of it (garble)

SPACECRAFT  I think when you get out further, Bruce, we'll be able to see the whole ship, right now, we can see a corner of it.

SPACECRAFT  Okay.

SPACECRAFT  (Garble) out there, Bruce.

SPACECRAFT  Looks great, the sun just came into my eyes, and that's a little bright, but not a big deal. Flying over the Florida Keys sort of. 1900 on the left, 1800 on the right. Let's see how this state of the art ranging device is going to work. Well I show myself about 80 feet out, something like that. Could go faster, but why rush it. You got me on the TV ranger yet?

SPACECRAFT  Not yet. You're going right above the ship.

SPACECRAFT  All right, yeah, that's what I'm trying to do. Trying to find if it's working out.

SPACECRAFT  Say, you may get the name of the world's fastest human being, going along at 4 miles per second, Bruce.

SPACECRAFT  This record will only stand I guess for the next hour or so.

SPACECRAFT  We passed over Florida and Cuba.

SPACECRAFT  Well I guess to break it, Robert is going to have to go ten percent faster.

SPACECRAFT  (Garble) delta V.
SPACECRAFT      Okay.

END OF TAPE
Okay, I'm showing myself at about 95 feet right now. Maybe right around 100. Got that ranger going yet?

We got you at 123 feet at about .3 feet per second.

Okay, that sounds about right. We always seem to have about a 25-foot difference between what I read and what the simulator up at Martin with Lex Ray and all those guys came up with. .3, okay. Give it a little more. Oh, what a view.

Houston, Challenger.

Go ahead, Challenger.

Why don't you go ahead and take the cameras and I'm going to work the lasers on cameras B and C.

Copy. We'll take the other camera. You've got Baker and Charlie, Ron.

Okay, 145 feet Bruce at, well, a little noisy, around .3 yet.

Okay, well, why don't I try to come to a stop here.

Yes, as a matter of fact you just had 150 feet so you probably better stop.

Yes, I should be just about stopped now and I'm reading 125, so yes. You should have a range rate of just about 0 now.

We're seeing about .2.

.2, okay. That's about - okay. And I'll come on back in.

Right.

How's that comm coming through, Jerry? - Capcom.

Challenger, Houston. The comm was coming through loud and clear.

Great. We'll continue in just a moment. Sorry, John, I was listening to Jerry over the tape.

Roger.

This is Mission Control. We're getting downlink from the Spacecraft of yesterday's MMU activities that were
recorded on the video tape recorded now being relayed to the ground.

SPACECRAFT  Vance, you want me to go back over and get that blanket right now?

SPACECRAFT  Bob, what's your status right now. The next thing we have scheduled for you is to lock safety tethers and translate the MFR. Why don't you go ahead and do that to stay on schedule and get the blanket later.

SPACECRAFT  Got you.

PAO  Seeing Astronaut Bruce McCandless on the middeck going through his inflight maintenance procedure for camera delta, repair of the television camera in the payload bay that he brought in yesterday on his spacewalk, repair and or actually is replacing it with a cabin TV camera.

CAPCOM  Challenger, Houston radio check. How do you read?

SPACECRAFT  John, understand we can go till 45.

CAPCOM  Challenger, Houston, radio check.

SPACECRAFT  Looks like it's real solid on quality.

SPACECRAFT  Yes, it really is and so far the only surprise is that, like I say, when I put on a +X for a couple of seconds I feel this sort of rumbling, rattling which I assume is interaction between the EMU and the MMU but we hadn't expected it. --

END OF TAPE
-- between the EMU and the MMU but we hadn't expect it. Yeah, whoever it is who built these visuals did a great job.

Houston, Challenger, were you trying to talk?

Roger, Challenger, Houston. How do you read?

Okay, loud and clear. John, what was the time you wanted us to go to minus XLV, YVZ?

Roger, we want you to go to that attitude after you have completed glow 2.

Going there now.

Okay, and after you are on your way to (garble).

Bruce is giving him a hand.

Copy that, Vance.

Jerry, the problem is (garble) trying to hold onto the rabbit ears, it's too slick.

Yeah, just hold onto it until Bruce gets those in.

Are you trying to restow it?

Yes.

Well put it in the RMS.

Trying to restow it.

Aren't we going to use it?

Oh, we got to get the (garbel) deployed.

Here we go. Pull it. Wait a second, stay back on your side there. You know what's happened, also, it looks like we broke it. (garble) maybe. Okay, let's float her in.

Challenger, Houston, I've got a couple notes for you, we would like to get TV during the initial portion of TDRS.

Houston, Challenger, understand when we get to -X LV, -YZZ, go ahead and deactivate SPAS?
CAPCOM  Roger, you can deactivate it now if you are done with glow 2, you can deactivate the SPAS while you're going to that attitude.

SPACECRAFT  Okay, we'll do it.

CAPCOM  Okay, the reason we're doing this, we didn't have the opportunity to tell you there with all the confusion. But the SPAS is a little warm, and we needed to cool it down, so we wanted to go to a cool attitude, and we'll be sending you up a teleprinter message that will provide some changes to this afternoon's activities. For example, the first one at 1+35, will be to delete the yaw sensor. At 1+35 in the CAP.

SPACECRAFT  Houston, Challenger, I got most of that, we figured it was probably a heating problem on the SPAS.

SPACECRAFT  Okay, Vance, we propose that he presses on with his normal timeline of doing the MEV's task, and we also suggest if time permits to add a force evaluation getting the device at the MEV station and that's on FS11 and 12 box 19.

SPACECRAFT  Okay, copy that. Did you get that, Bruce.

SPACECRAFT  Roger.

SPACECRAFT  You can add some ML 86, page --

SPACECRAFT  Okay.

SPACECRAFT  -- Main A and B, MMU port heaters A and B due to open.

SPACECRAFT  Okay, that's in work, Bob.

SPACECRAFT  I think the umbilicals are already disconnected, Bob.

SPACECRAFT  Okay, (garble) circuits. Okay, Vance.

SPACECRAFT  Say again?

SPACECRAFT  That's okay, we've already got that.

SPACECRAFT  Okay.

CAPCOM  Challenger. Houston, we're going to do blo'- stretch on the alpha camera if that's okay with you.

END OF TAPE
CAPCOM Challenger, Houston, we're going to do (garble) on the alpha camera, if that's ok with you.

SPACECRAFT Go ahead, Jerry, you can have it.

CAPCOM Ok, thank you.

SPACECRAFT Going back.

SPACECRAFT Piece of cake!

SPACECRAFT Ok, it looks good.

SPACECRAFT You're doing good, Ron.

SPACECRAFT All right, what do you want to do next?

SPACECRAFT Vance, what do I want to do next?

SPACECRAFT Let's do your hand controller checkouts, your attitudes.

SPACECRAFT What?

SPACECRAFT Your attitude, let me pitch and yaw a bit.

SPACECRAFT I'm not following you.

SPACECRAFT I want to pitch you forward, Bruce.

SPACECRAFT Ok.

SPACECRAFT Taking you back. Yawing left, are you feeling those motions?

SPACECRAFT Yes, they're very slow.

SPACECRAFT Yawing right, you're in (garble) too.

SPACECRAFT Really?

SPACECRAFT Yes, rolling to the right.

SPACECRAFT (garble) Bob, problems, (garble) what's happening to me.

SPACECRAFT You working on the (garble).

SPACECRAFT Stand by, Bruce.

SPACECRAFT Bob?

SPACECRAFT Yes?
SPACECRAFT  Tell you what happened to me, they got the pine
trees too far out so that when you pull the strap down over them,
you're really - they got the pine trees too far in, so when you
pull the strap down over it hard, you're missing it. There's
really too much slack, so what you got to do is feel for the pine
trees with your finger and just sort of push them down over it.

SPACECRAFT  Ok.

SPACECRAFT  Did that help any?

SPACECRAFT  Yes, sure did.

SPACECRAFT  Ok, Bruce, we're ready to put the --

SPACECRAFT  I'm still rearranging the furniture here.

SPACECRAFT  I'll stand by for your call.

SPACECRAFT  Ok, let's go forward.

SPACECRAFT  Ok, we're going to go forward.

SPACECRAFT  In my coordinates.

SPACECRAFT  Got ya.

SPACECRAFT  Little more, a little more, little bit more, keep
going, a little bit more, a little more, a little more, keep
going, keep going a little bit more. Ok, now let's go down on my
coordinates some.

SPACECRAFT  Going down.

SPACECRAFT  Houston, Challenger.

CAPCOM  Challenger, Houston, go.

SPACECRAFT  Houston, Challenger,

CAPCOM  Roger, Challenger, Houston, loud and clear.
Challenger, Houston, reading you loud and clear.

SPACECRAFT  Ok, John, we ran about 5 minutes over on our
allotted time on the dump, but wanted to show you a little of the
MFR work --

END OF TAPE
CAPCOM Challenger, Houston, reading you loud and clear.

SPACECRAFT Okay, John, we ran about 5 minutes over on our allotted time of the dump but wanted to show you a little of the MFR work if you were able to receive it. Understand that's all the dump you want, right?

CAPCOM Roger, that's all for now, Vance, and by the way, it was really great and we enjoyed watching it. Now that we have some clearer comm let me just clear up a little bit of what we were trying to do.

SPACECRAFT Okay, go ahead.

CAPCOM Okay, we had seen the SPAS getting a little warm and we needed to cool it down and go to a cold attitude so that's why I asked you after glow 2 was finished to go to that particular attitude I sent you to. And you can also, you know, go ahead and deactivate SPAS so that we can get it cooled down and we have a teleprinter message which we're going to send up to you that will provide the changes to this afternoon's activities.

SPACECRAFT Okay, copy.

CAPCOM And Challenger, Houston. That message is onboard now and the first activity that changes is the yaw sensor test at 4 plus 35.

SPACECRAFT Okay, copy.

CAPCOM And Challenger, Houston. Be advised, we're getting the middeck camera downlink right now live.

SPACECRAFT Okay, Houston. The middeck camera is the new camera delta. We've got it up on the flight deck if that's clear to you.

CAPCOM Yes, it is. We just wanted to let you know that we were seeing you TV live when you selected that camera.

SPACECRAFT Okay, we're trying to check it out now. I think it's okay. Did have one mishap, however. With the camera locked in place, it was not possible to engage the connector through the (garble) location of the pan/tilt mechanism. There was a misalignment of about an 8th of an inch so I had to release the lock and get the connector engaged and then push the camera back in and lock it and in forcing it into the lock position the cable guide that is on the, the intermediate cable guide that's nearest the tilt mechanism broke off so you're down to one cable guide which is mounted on the fixed base of the camera and other than that the IPM went nominally.
CAPCOM Okay, we understand and your configuration sounds good to us.

SPACECRAFT Ron is telling me we're getting no pan or tilt (garble) because all the circuit --

CAPCOM Challenger, Houston. Could you, you came through a little broken. Could you repeat your last statement please.

SPACECRAFT We are trying to get it to pan and tilt right now to see if it'll do that.

CAPCOM Okay.

PAO This is Mission Control Houston at 5 days, 1 hour, 2 minutes mission elapsed time. We have about 9 1/2 minutes remaining in this pass through the tracking data relay satellite. Crew has been told that they can deactivate the Shuttle Pallet Satellite and they will be letting that cool off. Some of the experiments mounted on the SPAS have been giving the payloads people some difficulties. They think that it may be a thermal problem. They want to let it cool off for a while. Handover is currently going on here in the Mission Control Center. Orbiter systems in general looking in good shape. The Spacecraft is in a 149 by 156 nautical mile orbit. Projections on the weather for the nominal end of mission landing site at KSC look good at the present time and weather is also projected to be good at the Edwards site. We have been seeing downlink television, some of it video taped during yesterday's spacewalk. Some of that tape recorded video we had seen and some we had not seen.

END OF TAPE
PAO

--- at the present time and weather is also projected to be good at the Edwards site. We have been seeing downlink television, some of it video taped during yesterday's spacewalk. Some of that tape recorded video we had seen and some we had not seen and we also had some live cabin television and the crew was also checking out a camera that they are going to reinstall in the payload bay tomorrow, one that had malfunctioned early in the flight. The crew brought it in on their spacewalk yesterday and have been switching it out with one of the cabin cameras and they will put it back out in the cargo bay which will aid in our views of the spacewalk to take place early tomorrow morning.

CAPCOM

Challenger, Houston is with you. One minute to Botswana LOS. TDRS is in and out so we may not see you again till Guam 1 plus 32.

SPACECRAFT

Okay, and we just got a good pass over South Africa here.

CAPCOM

Roger that.

SPACECRAFT

Houston, Challenger. Do you know if there's a tropical storm or a tropical depression or something like that over Madagascar?

CAPCOM

We'll check with weather for you.

SPACECRAFT

Okay, thanks.

PAO

This is Mission Control Houston 5 days, 1 hour, 17 minutes mission elapsed time. The Change-of-Shift Press Conference with off-going Flight Director is scheduled for approximately 8:45 this morning. That's about a 15 minute delay from the previous schedule to allow a little more time to complete the handover. And we also have the 9:30 briefing, NASA Administrator James Beggs and Lewis Lehr, the Chairman of the Board of 3M Corporation, will hold a joint press conference at NASA Headquarters at 9:30 am central time to make an important announcement about a materials processing research program in space. That one's at 9:30. For that Press Conference, reporters from the Johnson Space Center and the Kennedy Space Center will be able to participate via 2 way audio in a televised conference with questions and answers directed to NASA Headquarters in Washington or the 3M Corporation in St. Paul, Minnesota. Mission Control Houston 5 days, 1 hour, 31 minutes mission elapsed time. We're standing by for acquisition through the Guam station on orbit #82.

CAPCOM

Challenger, Houston is with you at Guam for 8 minutes.
Hello, John. We got you loud and clear through Guam.

Roger, you're loud and clear too.

Houston, Challenger.

Roger, go ahead.

Roger John. We concluded the checkout on the refurbished camera D. On the flight deck and the middeck outlets we can't get either the pan or the tilt function on one to work. We were wondering if that's something that's supposed to be capable of being commanded through the middeck and the flight deck outlets. Otherwise, the camera seems to work okay, over.

Roger and I'll let you know if INCO has an idea.

Okay.

Challenger, Houston. A note back up to you on your camera question.

Go ahead John.

Okay Bruce, what we believe is that you should be able to command pan and tilt from both the middeck or the flight deck and if you can't that function is just broken.

Okay, thank you very much. We sort of suspected that might be the case but we weren't sure.

Roger that and be advised on this Hawaii pass, we will be running an encryption test at Hawaii only so I'll be making encryption switch calls as we go LOS Guam and as we go LOS Hawaii.

Okay John.

END OF TAPE
CAPCOM  -- we will be running an encryption test at Hawaii only so I will be making encryption switch calls as we go LOS Guam and as we go LOS Hawaii.

SPACECRAFT  Ok John.

CAPCOM  Challenger, Houston. We're going LOS Guam in 40 seconds. We need the encryption to TR please.

SPACECRAFT  Ok John, encryption is going TR now.

CAPCOM  Thank you and we'll see you at Hawaii in 6 minutes.

SPACECRAFT  Ok, we'll see you there.

PAO  Mission Control Houston 5 days, 1 hour, 40 minutes Mission Elapsed Time. We've lost contact with the Challenger through the Guam station and will be picking up in about 5-1/2 minutes over Hawaii. This is Mission Control Houston at 5 days, 1 hour and 45 minutes Mission Elapsed Time. We're about a minute and a half away from picking up over the Hawaii station. We have decided due to schedule conflicts to go ahead and cancel the Change-of-Shift Press Conference with the off-going Flight Director Randy Stone. The handover not fully complete here in Mission Control at the present time. The oncoming Flight Director Harold Draughon continuing to discuss with his people a few minor changes in plans for the afternoon and the handover having run over to where we think that the Press Conference might conflict with the one coming up at 9:30 and the fact that there have been no significant items occur during the last shift, no problems of Orbiter systems of any significance. We'll go ahead and cancel that Change-of-Shift Press Conference. The crew has been doing some troubleshooting with a water tank dump valve, that's a minor work-around problem and they have been asked to deactivate the SPAS, the Shuttle Pallet Satellite. May be some thermal difficulties there interfering with the experiments. They're going to turn that off and let it cool off for a while and then reactivate it later. We got some downlink television on the last TDRS pass of activities yesterday and some of the changeout of the camera for the payload bay. Repeating, we're canceling the Randy Stone Change-of-Shift Press Conference as the handover has taken a little longer than expected and Stone has been unable to leave the console while his relief Flight Director has been talking with the new shift coming on. We will go ahead and delete that Change-of-Shift Press Conference so that it does not interfere with the 9:30 briefing with NASA Administrator Jim Beggs and the President of the 3M Corporation coming up at 9:30.

CAPCOM  Challenger, Houston. Hawaii for 6-1/2.

SPACECRAFT  Roger, Houston.
Hey, we got Jerry back with us.

That's affirm. Good morning guys.

Did you get all rested up after yesterday.

That's a negative.

We're keeping you pretty, we kept you pretty busy, I guess.

Yes, I thought my workload was going to come down by 50 percent when you guys left town.

Just went up, huh?

Hey, Jerry.

Go ahead.

The HRM folks want to know their activation time, it was day 5, 003530.

Copy that Bob, thank you, and while we're taking attitude checks this morning, how do you guys feel after your endeavors yesterday?

Great.

Ready to have at it again tomorrow, right?

Ready and willing.

The crew's in great shape here, Jerry. I think everybody's just feeling on top of the world for the most part, I mean physically. A couple of disappointments on the mission but as far as adapting to 0g and everything, why it's really great.

Copy all that Vance. We certainly had a good time watching you all yesterday, and you're the talk of the world this morning.

END OF TAPE
SPACECRAFT  just feeling on top of the world for the most part, I mean physically. A couple of disappointments on the mission, but as far as adapting to 0g and everything, why it's really great.

CAPCOM  Copy, all that Vance. We certainly had a good time watching you all yesterday and you know you're the talk of the world this morning.

SPACECRAFT  Yes, I'm even willing to go out and kick at those foot restraints some more.

SPACECRAFT  We're most of the way through the maintenance recharge procedures now. We've got the water recharge complete and the MMU batteries are on charge and I can read you down the percentages from tank C in a couple of minutes, (garble).

CAPCOM  Okay, Bruce. We'll be standing by for those, and thanks for the status. And Challenger, Houston. We've found out that the weather you were looking at down there around Madagascar was not a tropical storm. It was, however, a long extended trough... It extended all the way from the southeast coast of Africa, past Madagascar and out into the Indian Ocean for quite a ways.

SPACECRAFT  Okay, great. Thanks Jerry. That's what we were seeing and we saw some rotations in the thing that lead us to believe that maybe it might be either building into a storm or a depression or something like that. Thanks.

SPACECRAFT  We talked it over onboard and we decided that in order to share all the good deals Vance and I get to go outside tomorrow.

CAPCOM  That sounds fair to me Hoot, and for your information you guys, we've got some company up there this morning. The Soviets launched at 6:08 a.m., they're going up to rendezvous with the salute. And for your information, that makes an all time record having 8 folks in space at one time.

SPACECRAFT  Well, how about that.

SPACECRAFT  Oh great. It's really getting to be populated up here.

SPACECRAFT  Actually only two life forms. Make sure we keep that (garble).

SPACECRAFT  And Jerry, Ron says he's going to fight all of us to go out outside tomorrow and I think he's tougher than any of us, so we may have to listen to him.
CAPCOM Roger, I don't think I'd want to have to argue with him.

SPACECRAFT Fortunately, my suit's too small for any of them so I'm not worried.

CAPCOM Copy that Bob, but it sounds like your feet are too big.

SPACECRAFT Yes, I was told you have to get use to boots that don't fit right. If I told a lie that big lightening would strike up and wipe us out. There she is. Hoot, talks to her at length about spaceflight. At least that's what he told Mary the last time I heard her.

CAPCOM Challenger, Houston. 30 seconds LOS Hawaii. Configure encryption to bypass. Two minutes to TDRS.

SPACECRAFT Okay Jerry. Encryption going bypass. See you on TDRS.

PAO Mission Control Houston, 5 days, 1 hour, 54 minutes mission elapsed time. We've lost the contact through the Hawaii station and we'll pick up in just a little bit less than a minute through the tracking data relay satellite on orbit number 82.

SPACECRAFT -- where the SPAS is going to be is right up above there.

CAPCOM Challenger, Houston through TDRS.

SPACECRAFT (garble) Did you close the bag. Like a piece of trash.

CAPCOM And Challenger, Houston. We seem to be getting Bob on air-to-ground.

SPACECRAFT Say that again Jerry.

CAPCOM Roger. Bob, I think your hitting air-to-ground when your trying to do ICOM.

PAO Mission Control Houston 5 days, 2 hours, 6 minutes mission elapsed time. Challenger passing over the southwest coast of Mexico right now. Just a reminder that at 9:30 central time we will be having a joint press conference. NASA Administrator James Beggs, and Lewis Lehr, the chairman --

END OF TAPE
PAO  -- Challenger passing over the southwest coast of Mexico right now. Just a reminder that at 9:30 central time we will be having a joint press conference. NASA Administrator James Beggs and Lewis Lehr, the Chairman of the Board of 3M Corporation, will hold a joint press conference at NASA Headquarters beginning at 9:30 am central standard time to make an important announcement about a materials processing research program in space. Reporters from the Johnson Space Center and the Kennedy Space Center will be able to participate via 2 way audio in a televised conference with questions and answers directed to NASA Headquarters in Washington or the 3M Corporation in St. Paul, Minnesota. Again, we'll have that joint press conference beginning at 9:30 this morning central time. This is Mission Control.

CAPCOM  Challenger, Houston for somebody up front.

SPACECRAFT  Go ahead.

CAPCOM  Roger Vance. We see the left OMS tanks coming down in pressure. We'd like to go ahead and repress the prop tanks on the left side.

SPACECRAFT  Okay, Hoot's got that one in work.

CAPCOM  Copy, thank you.

CAPCOM  Challenger, Houston. Be advised we're going to be turning on the MOMS.

SPACECRAFT  And mostly scattered cloud cover under us.

CAPCOM  Okay Vance. Copy that last part. A lot of clouds underneath you or scattered at least.

SPACECRAFT  That's right. It's, most places about 30 to 40 percent coverage along here.

CAPCOM  Okay. We're going to turn the MOMS on and let it heat up. I'm not exactly sure where they're planning to do their data take.

SPACECRAFT  Okay.

PAO  This is Mission Control Houston 5 days, 2 hours, 26 minutes mission elapsed time. We're less than 4 minutes away from the start of the joint press conference on the commercial use of space. That would be at 9:30 central time, 10:30 eastern time coming up in just a few minutes here with NASA Administrator James Beggs and Chairman of the Board of 3M Corporation, Lewis Lehr, holding a joint press conference, NASA Headquarters and 3M Corporation in St. Paul, Minnesota.
CAPCOM  Challenger, Houston going LOS TDRS. Guam next at 03 08.

SPACECRAFT  Okay Jerry, we'll see you there.

PAO  Mission Control Houston 5 days, 2 hours, 48 minutes mission elapsed time. We have loss of signal through the tracking data relay satellite and we'll pick up again in 20 minutes over the Guam station.

CAPCOM  Challenger, Houston at Guam for 7 minutes.

SPACECRAFT  Roger Jerry, loud and clear.

CAPCOM  Okay Vance, I've got several notes for you. First of all, we're sending message 45 charlie mass spec program 6 procedures updates. Also, I'd like to talk a little bit about COAS and your H2O supply water dump procedures.

SPACECRAFT  Okay, go ahead.

CAPCOM  Okay Vance. We'd like to have a little of a bit of a status on what you found when you looked at the COAS mounting plate. Was it secure? Did you find any problems there?

SPACECRAFT  I didn't find any problems with it. Are you finding a scatter or a bias?

CAPCOM  We're finding both. We're finding about a half degree of bias and quite a bit of scatter in the marks you've been taking both yesterday and after you did the inspection today. Also, did you verify Vance that the barrel was indexed firmly to the -Z position?

SPACECRAFT  Yes, sure did. It's been in that position the whole mission and it was checked each time.

CAPCOM  Okay, copy that. Just for your information, the set that you did before we depressed the cabin looks solid. It was probably in the tightest cluster we've ever had on a bunch of COAS marks. But the two that you've done since --

END OF TAPE
CAPCOM            -- about a half degree of bias and quite a bit of
scattering the marks that you have been taking both yesterday and
after you did the inspection today. Also did you verify, Vance,
that the barrel was indexed firmly to the -2 position.

SPACECRAFT        Yes, sure did. It's been in that position the
whole mission, and it was checked each time.

CAPCOM            Okay, copy that, just for your information, the set
that you did before we depress the cabin looks solid, it was
probably in the tightest cluster we've ever had on a bunch of
COAS marks. But the two that you've done since we depressed have
been fairly large biases and a lot of scatter in them.

SPACECRAFT        And would you expect any bias, I know you wouldn't
expect scatter, but would you expect any bias?

CAPCOM            We probably expected some, Vance, but not to the
magnitude that we got.

SPACECRAFT        Okay, well, I don't know what to say. It seemed
like the marks the last couple of times were not all that
different from the first time.

CAPCOM            Okay, copy that. I guess just one final note on
the COAS right now, we plan right now on doing an additional COAS
cal, once we have repressed to 147.

SPACECRAFT        Okay, fine.

CAPCOM            Okay, next is the H2O supply dump. Vance, we would
like you to go over to R12, ensure that the dump valve enable
nozzle heater is on. We'd then like to take the supply H2O dump
valve to closed, hold it for 5 seconds, looking for the talkback,
close. After holding it 5 seconds, we'd like to go to open; hold
it 5 seconds, and hopefully we'll see the talkback go open.

SPACECRAFT        Okay, want to go over to check, verify, that the
supply dump heater is on, and then after that, take the H2O dump
valve, go - well, cycle it 5 minutes open, then 5 minutes closed.

CAPCOM            Roger, Vance, all good, we'd like 5 seconds.

SPACECRAFT        5 seconds open, 5 seconds closed.

CAPCOM            Roger that, and we're looking to see if we get a
talkback open this time.

SPACECRAFT        Okay, in work.
CAPCOM And Challenger, Houston. Vance, I want to make sure we got things straight. On the dump valve we would like to go to close for 5 seconds, and then to open for 5 seconds.

SPACECRAFT Okay, well I'm looking at the panel now, and the dump valve, enable slash nozzle heater was off, and the dump valve is closed, and I just turned the heater on, you want me to hold off or do this procedure immediately, and that would be to hit it closed for 5 seconds and open for 5 seconds, observing the talkback.

CAPCOM Roger, Vance, the temps and aline are okay, we'd like you to go ahead and enable the dump valve, the nozzle, the dump valve enable nozzle heater on, and then go ahead hold closed for 5 seconds and then open for 5.

SPACECRAFT Okay, in work. Okay, that was performed, closed and then opened for 5 seconds each. No change in the talkback, it remains closed.

CAPCOM Roger, copy that, Vance, you're go then to turn the dump valve enable nozzle heater switch to off.

SPACECRAFT Okay, switch to coming off.

CAPCOM And Vance, I've got one change for you on message 39, if you can find it. That's a TMBU summary number 2.

SPACECRAFT Okay, if it's the TMBU summary, it's downstairs, why don't I just copy what the change is and then go down and look for it.

CAPCOM That's fine Vance, on line 14, you should move those 2 parameters one column each to the left. That will make the SM alert numbers low 42.0, high 90.0. And the 42.0 is the one underlined, that's the one that's been changed.

SPACECRAFT Okay, and that was message 39.

CAPCOM That's affirm, we're less then 30 seconds to LOS, Hawaii next in 6 minutes.

SPACECRAFT Okay.

END OF TAPE
CAPCOM: That's affirm, we're less then 30 seconds to LOS, Hawaii next in 6 minutes.

SPACECRAFT: Ok.

CAPCOM: Challenger, Houston, Hawaii for 7-1/2.

SPACECRAFT: Ok, Jerry, loud and clear. And we have your teleprinter message on the Mass Spec procedures change.

CAPCOM: Ok, Vance, thank you.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.

SPACECRAFT: Your test on the supply water over-board dump with Hoot. What are your conclusions now, can you say, do think the line is frozen up definitely?

CAPCOM: That essentially is our conclusion on that, Vance, yes, we think the valve is frozen closed.

SPACECRAFT: Spacecraft attitude change some time or another help to unfreeze it?

CAPCOM: We're looking at it, we're rather doubtful it'd help, but we're thinking about it.

SPACECRAFT: Ok.

CAPCOM: Challenger, Houston, we see that you've set up your track option for your next maneuver. We'd like you to go to track on that one.

SPACECRAFT: Roger.

CAPCOM: And Challenger, by popular demand we have a switch hit request on A7 when somebody is back there.

SPACECRAFT: Ok, A7.

CAPCOM: MADS strain gage to PCM enable, please.

SPACECRAFT: Standby. Ok, MADS strain gage to PCM is enabled.

CAPCOM: Ok, Vance, thank you.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.
SPACECRAFT  Roger, Jerry, I just checked or double checked and we have the next maneuver set up. Looks ok to me, -Z solar inertial target for body vector 3. And was there a DAP change, I mean, yes, a DAP change?

CAPCOM  Ok, Vance, we concur that it's set up properly. We'd like you to go do an ITEM 19 to take it to track.

SPACECRAFT  Ok.

CAPCOM  Challenger, Houston, going LOS Hawaii, TDRS in 1.

SPACECRAFT  Ok, Jerry.

PAO  This is Mission Control Houston at 5 days, 3 hours, 47 minutes Mission Elapsed Time. The Challenger has just crossed the equator moving south on its ground track, orbit #83 and is about to cross the coast of South America at the present time. Things are fairly quiet here in Mission Control, a few changes to experiment activities later in the day on the SPAS working with the Mass Spectrometer.

CAPCOM  Challenger, Houston, through TDRS.

SPACECRAFT  Houston, Challenger, go ahead.

CAPCOM  Roger, Vance, finally got you that was a long 1 minute.

SPACECRAFT  Ok.

CAPCOM  Challenger, Houston, I've got a couple of switches in the middeck if someone's available.

SPACECRAFT  Ok, I'll get them.

CAPCOM  Ok, Vance, the first one is MO32M, you can go ahead and turn LAH O2 valve 5 back to open, start flowing O2.

SPACECRAFT  Ok, it's open.

CAPCOM  And the second one Vance --

SPACECRAFT  That's MO32M.

CAPCOM  That's affirm LAH O2 valve 5 to open. The second one is ML31 Charlie, we would like supply H2O tank delta outlet to close.

SPACECRAFT  Ok, supply H2O tank delta outlet is closed, talkback closed.
CAPCOM          Roger, Vance, and that's permitting us to isolate tank C.

SPACECRAFT     And I was noticing we'll need to pump up a little oxygen pretty soon. Do you concur on that, Houston?

CAPCOM          Roger, Vance, stand by. I think that's why they had you turn that LEH valve back on, we'll start flowing O2 thru that little orifice.

SPACECRAFT     I see, ok.

CAPCOM          And that's been confirmed, Vance.

SPACECRAFT     Ok, and no manual --

END OF TAPE
SPACECRAFT       -- pretty soon, do you concur on that Houston?
CAPCOM           Roger, Vance, standby. I think that's why they had you turn that LEH valve back to on. We'll start flowing O2 through that little orifice.
SPACECRAFT      I see, okay.
CAPCOM           And that's been confirmed Vance.
SPACECRAFT      Okay, no manual procedure necessary then other than that.
CAPCOM           We don't think so. Challenger, Houston. Vance, be advised we'll be sending you a new state vector.
SPACECRAFT      Okay, copy.
PAO               Mission Control at 5 days, 3 hours, 57 minutes mission elapsed time. In a couple of minutes, we'll have a playback of some earlier tape recorded video that was dumped to the ground of EVA 1. That is coming up here at 11:00 central time, satellite playback of the orbit 81 VTR dump of EVA 1. Challenger is out over the continent of South America at the present time, orbit number 83. In the Control Center here, troubleshooting just a couple of minor anomalies. The crew had earlier turned off the SPAS, allowed it to cool off, and then they're going to be operating it a little later this afternoon. They will be doing the yaw sensor and solar cell experiments as well as the mass spectrometer activation. We're about an hour, at the present time, away from the beginning of the presleep activity which is usually the end of the day wrap up things including meal preparation and IMU alignments, that sort of thing, toward the end of the day. And we're getting to that point of the day where we will have very little crew communication very shortly. They are working some of the SPAS experiments and there was some troubleshooting of the valve problem on one of the water tanks. Earlier this morning we had the weather report from a Flight Dynamics Officer that weather at both potential landing sites for the weekend looks good. This is Mission Control Houston.
CAPCOM           Challenger, Houston. We would like you to perform step 3 of the solar cell experiment please.
CAPCOM           Challenger, Houston. 7 minutes till LOS TDRS. Guam next at 04 45.
SPACECRAFT      Jerry, we only heard the first -- call 7 minutes to LOS.
CAPCOM           Okay. 7 minutes till LOS. Guam next at 04 45.
This is Mission Control Houston at 5 days, 4 hours, 23 minutes mission elapsed time. We've had loss of signal through the range of the tracking data relay satellite at the very end of orbit #83. Challenger out over the Indian Ocean. We're starting orbit #84 very shortly and we're about 22 minutes away from picking up contact with the crew again. That will be over the Guam station, a fairly short pass, just a maximum elevation of 4 degrees and then we'll pick up over Hawaii about 33 minutes from now for a fairly long pass. Spacecraft will come practically right --
PAO -- short pass, just a maximum elevation of 4 degrees and then we'll pick up over Hawaii about 33 minutes from now for a fairly long pass. Spacecraft will come practically right down over the island chain on that pass. Crew is going through some of the experiment operations with the SPAS. It was powered off earlier to allow it to cool down. Some of the experiment difficulties that they'd had earlier with were attributed to a thermal condition. They powered it down to cool off for a period of time and then reinitiated some experiment operations. Some of those experiment operations to be occurring a little bit later this afternoon. The crew is about 30 minutes away from the closeout of the routine activities today on the timeline. They get into their presleep activity in about half an hour and they're due to go to bed for the night about 3 pm this afternoon. The presleep activity is a 3 hour period that involves a number of things, but it's primarily not timely or not tightly timelined period in which the crew can prepare and eat their evening meal, do some of the housekeeping functions onboard the spacecraft, catch up with any left over items from earlier in the day that they would like to keep up with. And they will be getting up to start their next day, flight day 7, about 11 pm central time and they'll be getting into the preparations for the second spacewalk of this flight, additional checkouts of the Manned Manuevering Units and a series of docking practices with the SPAS, the Shuttle Pallet Satellite rotating on the end of the 50 foot mechanical arm. That will simulate the task that will be required of the crew on the next Shuttle flight in April in which they attempt to, while wearing the MMUs, very carefully dock with the slowly rotating Solar Maximum Satellite to stabilize that satellite, move it into position where it can be repaired by the astronauts. At 5 days, 4 hours, 27 minutes Mission Elapsed Time, this is Mission Control Houston.

PAO Mission Control Houston 5 days, 4 hours, 45 minutes. We're standing by for a brief pass over the Guam station.

CAPCOM Challenger, Houston with you through Guam for 5 minutes.

SPACECRAFT Hi Mary, welcome aboard.

CAPCOM Howdy, nice to be back with you today.

SPACECRAFT Same here. What's going on down there? It's about almost supper time up here.

CAPCOM Well, it's lunch time down here, and I guess Jerry had to jump out and get some lunch.

SPACECRAFT Been turned around getting a lot of SPAS data and other data for you today.
CAPCOM       Thanks. Yes, everybody down here seems real happy today. Seems like it's going real well. Challenger, Houston. Be advised we just sent up 2 teleprinter messages 46 alpha and 47.

SPACECRAFT   Ok, we'll look for them.

PAO          Mission Control standing by for acquisition through Hawaii.

CAPCOM       Challenger, Houston with you over Hawaii for 8 minutes.

SPACECRAFT   Roger, Mary, and if you don't have anything, are you watching CRT 2?

CAPCOM       Roger, we'll watch.

SPACECRAFT   Ok. End of test.

CAPCOM       Roger, we copy. We were watching it.

END OF TAPE
CAPCOM     Roger, we copy. We were watching it.

CAPCOM     Challenger, Houston. We're 40 seconds LOS here at Hawaii. We're going to drop you for a couple of minutes and then pick you up through TDRS.

PAO     This is Mission Control at 5 hours, 5 days, 5 hours, and 5 minutes mission elapsed time. Challenger out of the range of the Hawaii station. We have about a minute and a half gap before we pick up through the tracking data relay satellite. This is the point in the day where the Flight Controllers here in Mission Control are beginning to review the condition of the systems onboard, decide what water dumps need to be done, what quantities to hold in what tanks, that sort of thing, to have the ship all settled down for the night so the crew can get a good night sleep without any alarms of any kind disturbing them. We are in the scheduled crew presleep period now during which they would prepare their evening meal and do a few other minor things before the start of the scheduled sleep period about 3 this afternoon. About 30 seconds away from reacquiring through the TDRS.

CAPCOM     Challenger, Houston with you through TDRS.

SPACECRAFT     Ok, Houston, loud and clear.

CAPCOM     Got you loud and clear, too, Hooter.

CAPCOM     And Challenger, Houston. Have a request for a software dump when you're ready to copy.

SPACECRAFT     Ok, go ahead.

CAPCOM     Roger. We would like to see a software dump of GPC1 and that's to try to help us troubleshoot the CRT 2 power cycles that you performed. And you can do that by using the malf book page 5-70. It's the DIPS SSR2 GPC software initiated memory dump, over.

SPACECRAFT     Ok, Mary. We'll send you a software dump for GPC1, Malf 5-70, SSR2.

CAPCOM     Sounds good. And also Hooter, that's at your convinience. No rush.

SPACECRAFT     Ok, also Mary for --

CAPCOM     Challenger, Houston back with you through AGO. We had a TDRS drop out and Hooter, if you'd say everything after "also".
SPACECRAFT    Ok, Mary. We also will pump the cabin during
presleep — believe that we should pump it up with O2.

CAPCOM        And Challenger, Houston. We concur with pumping
the cabin up with O2.

SPACECRAFT    Ok, thanks Mary.

CAPCOM        And Challenger, Houston. ECCOM's requesting that
you go to 10-5 like you did last night.

SPACECRAFT    Ok, will do, Mary. We'll take it to 10.5.

PAO           Mission Control Houston 5 days, 5 hours, 30 minutes
Mission Elapsed Time. The crew is bringing up the pressure in
the cabin atmosphere up to 10.5 psi from the 10.15 that it's
hovering around right now. They're bringing that up with
additional oxygen and that will set them for the night and the
pressure will gradually creep down to about the 10.2 level for
tomorrows' EVA activities.

CAPCOM        Challenger, Houston back with you through TDRS.

SPACECRAFT    Ok Mary, and I'll do the software dump now. Hoot's
getting the pressure adjustment.

CAPCOM        OK, we're standing by. And also Vance, we did send
up in AGO teleprinter messages 48 and 49. The 48 is presleep
activity — —

END OF TAPE
CAPCOM       Okay, we're standing by. And also Vance, we did send up in AGO teleprinter messages 48 and 49. The 48 is presleep activities for you, a couple of them. And then a block weather update on 49.

SPACECRAFT   Okay.

PAO          This is Mission Control. During some of the recent conversations Capcom Mary Cleave asked the crew to prepare for a software dump off of GPC 1 to help them, help the ground controllers troubleshoot a peculiar item they have observed on CRT 2 associated with the power cycles on that display. Appears to be functioning normal. Apparently they've seen a couple of hiccups in the way that thing has worked and they have asked the crew to ship them the software out of general purpose computer number 1 to see if there is any clue to some of the odd things they have seen off that CRT. Crew is bringing the cabin atmosphere up now. It's, bring it around 10.3. They've got to bring it up to 10.5 before the evening. Challenger is on orbit number 84 just crossing the east coast of South America down at, near the lower reaches of its ground track about 28 and 1/2 degrees south latitude and is moving out over the south Atlantic. This is the point of the day prior to crew sleep, when the flight controllers are reviewing the Orbiter systems. Trying to make sure that everything will be properly configured for the night, that the quantities of water in the water storage tanks are at a reasonable level, that the fuel cells have been purged, that the cabin atmosphere is in good shape, and all of the other associated maintenance functions are taken care of so that the crew will not be awakened during the night by any alarms calling for them to make any of those adjustments during the night. The crew in about an hour will be powering off the shuttle pallet satellite, it has been running some additional experiments, later this afternoon. And they will be turning that off in about an hour. It's about 2 hours and 25 minutes remaining before we put the crew to bed for the night. Usually the last communication with the crew is sometime before that as they try and let the crew follow their own pace during this presleep activity period. That period is a block of time about 3 hours in the crew activity plan during which the crew can prepare their evening meal and eat it and finish up any last minute items. It's not intended to be a time where they conduct experiments, although it usually is, does involve some end of the day wrap up of experiments.

CAPCOM       Challenger, Houston. Go ahead Vance.

SPACECRAFT   Okay. Software dump's complete. It's on OPS recorder 1, track 2, reverse. Percent of tape about 55 to 60 and MET is 5 days, 5 hours, 34 minutes, 5 seconds.

CAPCOM       Okay, we copy that. Thanks.
SPACECRAFT Roger.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead.

CAPCOM Roger, Vance. No crew action required, just wanted to let you know that the MOMS data take is complete and that's all wrapped up for the rest of the flight.

SPACECRAFT Okay, real good. Understand, sure hope it all turns out.

CAPCOM Roger, we copy. And Challenger, Houston. We'd like to do a waste tank dump with one delta this evening, and if you'd go to ML 31 charlie, to start with, just one step, and take the waste water dump valve enable nozzle heater to on.

END OI' TAPE
CAPCOM -- and if you would go to ML 31 Charlie, to start with, just 1 step, and take the waste water dump valve enable nozzle heater to on.

SPACECRAFT Ok, you want us to do that now, is that what I'm hearing?

CAPCOM Roger, just to set up for the dump, we'd like one action on ML 31 Charlie waste water dump valve enable nozzle heater on, and then on our call, we'll ask you dump the waste tank to 0 percent.

SPACECRAFT Ok, I'm going down there to get that heater now, Mary.

CAPCOM Roger, Hooter, we've got one change to that dump procedure for this evening, so if you wanted to grab your orbit ops checklist on the way back up and I'll talk to you about that when you're ready.

SPACECRAFT Ok Mary, I'm with you on pg 5 dash --

CAPCOM Ok, Hooter, pg 5-4, and if you go over on pg 5-5, under step 2 dump termination, that first callout on ML 31 Charlie, we would like you to leave the waste water dump isol valve open.

SPACECRAFT Ok, that's what we did on the other dump too, was leave the waste water dump isol valve open and I'll leave that open again.

CAPCOM Roger, Hoot, and we just wanted the heaters on so ECOM could take a look at the data while we're still here under the TDRS umbrella.

SPACECRAFT Ok, sounds good.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM Roger, Hoot, on that message 44-alpha that we sent up on the SPAS ops updates, there was a callout for, at 5 days, 5 hours, and 50 minutes, about 5 minutes from now, you were suppose to perform Mass Spec activation, and we'd like you to know it's already on and so that could be deleted, however, payloads would like to know how close to the -2 you were able to get the Mass Spec.

SPACECRAFT Mary, it looks like right now that the Mass Spec is about 10 or 15 degrees from being -2.
CAPCOM      Ok, copy that, and also we'd like to get some verification that you did receive the 2 teleprinter messages that we sent to you at AGO.

SPACECRAFT Ok, let me check --

SPACECRAFT And Mary, we just received message 49A.

CAPCOM      We copy you just got message 49.

SPACECRAFT And Mary, we do have 44 Alfa that's the one on the Mass Spec.

CAPCOM      Roger, we need a verification on 48 and 49, which we just sent over AGO. And you said you did get 49, did you get the 48 also?

SPACECRAFT Ok, stand by while we make sure, Mary.

CAPCOM      Ok, sorry to keep running you around like this. Challenger, Houston, if it'll help you out, 48 was sent after 49, and 48 is a block weather update.

SPACECRAFT Ok, 48's the weather update. Ok, yes, we have it, that threw us off as it came after 49A, but it's right on the same sheet of paper.

CAPCOM      Ok, thanks, Vance, they switched the order around because 49 had a higher priority. Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM      Roger, Vance, we wanted to verify that in your IMU align roll startracker that you are doing step #2 of pg 7-4 initiate roll at sunset, where you are doing an LVLH auto-track.

SPACECRAFT Yes that's affirmative, Mary, the note, well the note on step 6 in Mass Spec confused us momentarily, but that's the way we're doing it.

CAPCOM      Copy. Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM      Roger, for Hoot, there will be no waste water dump tonight. The signature on that dump nozzle heater looks about the same as the one previously on your water dump nozzle, so we'd like to hold and just back out of this dump for this evening. Take your waste water dump valve enable nozzle heater on ML 31 Charlie back to off.

END OF TAPE
Go ahead Mary.

Roger, for Hoot, there will be no waste water dump tonight. The signature on that dump nozzle looks about the same as the one previously, on your water dump nozzle. So we would like to hold, and just back out of this dump for this evening. Take your waste water dump valve enable nozzle heater on, ML 31 charlie, back to off. And, we'll work on dumping tomorrow morning. Challenger, Houston, we're about 30 seconds LOS and we'll talk to you at Guam, 6+24, and did you copy the last on backing out of the waste water dump.

That's affirmative, Mary, Vance is on his way down to shut it off.

Yes, we're having trouble keeping the mass spec in the -Z direction. It goes there, holds for a few seconds, and then goes back to -X. It's holding at the moment, we started the roll maneuver. Still holding.

Copy that.

It went back to +X after the maneuver had started and I did a - (garble).

This is Mission Control Houston, at 5 days, 6 hours, 2 minutes, mission elapsed time. We have loss of signal with the Challenger, through the tracking data relay satellite at the start of orbit number 85. And we'll pick up again in about 22 minutes for a very brief pass, over the Guam station, just over the edge of the range of that station. May not be any communications through that one. And after that, 30 minutes from now, 31 minutes from now, we'll pick up over the Hawaii station.

Challenger, Houston, with you through Guam, for 2 minutes.

Okay, Mary, we got you loud and clear.

You're loud and clear too.

And, Mary, we have completed (garble)

Challenger, Houston, you're cutting out, say again.

Mary, we show that we are suppose to deactivate the SPAS now that mass spec (garble) is done.

That's affirmative.

Okay, thank you.
CAPCOM    And also I have a question for Bobby Stewart when he's able to answer one.

SPACECRAFT  Bobby will be on in a minute.

CAPCOM    Okay, thanks.

SPACECRAFT  Mary, while you're waiting for Bob to come up, the, I take it that the mass spec deactivation, we ought to omit them, item 6'1 as well. The, we were expected to omit it in the previous step, but it did not address that step 7, over.

CAPCOM    That's affirmative, Ron, we, the payload guys would like everything powered down for the night.

SPACECRAFT  Okay, Mary, what you need?

CAPCOM    Good evening, Bob, we'd like to know if you think you're going to have any problems doing the hydrazene experiment, tomorrow because of your PFR problem?

SPACECRAFT  I'm sorry, you broke up, could you say that again please?

CAPCOM    Roger, because of your portable foot restraint problems in the previous EVA, the guys down here were wondering whether that would create any special problems for you doing the hydrazene experiment in the EVA tomorrow?

SPACECRAFT  I don't think so, once I get in there, I'm still wedged in, it's not a big thing. It's just getting into and out of them that's a problem.

CAPCOM    Copy that.

SPACECRAFT  And, Mary, my opinion yesterday was bad because I had to do so many translations, I was running all over the bay, tomorrow we are mostly staying in fixed spaces either the MSS or (garble) so I don't see that that's a big problem. Of course, I'd like the boots that fit but it's no big thing for tomorrow.

CAPCOM    Roger, copy, thanks, Bob.

SPACECRAFT  Mary, I didn't -

END OF TAPE
CAPCOM    Roger, copy, thanks, Bob.

SPACECRAFT    Mary, I wasn't sure if I made my question clear last time, I was questioning the fact that in the previous step we were instructed to delete Mass Spec shield close. The item 6+1, but we were not instructed to do so in step 7, deactivation, where we are again asked to perform an item 6+1. The question is do we delete it in step 7, or perform that step as written.

CAPCOM    We're checking on that now for you, Ron, and we're about 20 seconds LOS, we'll talk to you through Hawaii at 6+33.

SPACECRAFT    Roger.

PAO    Mission Control Houston, we'll be getting some Earth views from the spacecraft at 1:44, spacecraft TV being downlinked and we're in acquisition through the Hawaii station.

CAPCOM    Challenger, Houston, with thru Hawaii for 7 minutes.

SPACECRAFT    H, Mary, we've got you.

CAPCOM    Got you loud and clear, too. Got a couple items for you.

SPACECRAFT    Ok, ready to copy.

CAPCOM    First of all, answering Ron's question left from Guam, they want you to do that Mass Spec deactivation with 6+1, they do need the shield work done, and so it's to be performed as originaly written.

SPACECRAFT    Ok, we'll do that.

CAPCOM    Also, they didn't get Ron on UHF through Guam, and so we'd like him to check his UHF config.

SPACECRAFT    Ok, yes, he had that changed for some VTR recording that he was doing, so we'll get that fixed.

CAPCOM    Ok, fine and I have some changes to your CAP when you're ready copy.

SPACECRAFT    Ok, ready.

CAPCOM    At 5 days, 6 hours, 40 minutes, after the SPAS deactivation that was scheduled in your teleprinter message of #44-alpha, we'd like to add, load PCMMU format per the orbit ops checklist, load formats 103 161.
SPACECRAFT    Ok, that's go to PCM formats 103 and 161 after SPAS deactivation.

CAPCOM      Roger, and then also we would like you to FDA on your Decom 4 disabled.

SPACECRAFT  Ok, we'll do.

CAPCOM      Then have 3, 2 items that we're going to give you in presleep here because they're real early and you might not get to them before your mail call tomorrow morning.

SPACECRAFT  Ok, good idea, Mary.

CAPCOM      At 5 days, 16 hours, and 10 minutes, we'd like to add SPAS 01 activation per the Payload Ops checklist SPAS 01 activation. At 5 days, 16 hours and 10 minutes, we'd like to add Mass Spec, Step 1 for the Payload Ops SPAS 01, and that's a SPAS 01 attached experiment.

SPACECRAFT  Ok, boy you're really going to put us to work early, Mary, at 16:10 tomorrow morning, that's at 5 days 16:10, we will do SPAS activation and then ready the Mass Spec step 1.

CAPCOM      That's a good readback. And Challenger, Houston, when you're ready to read down the IMU alignment numbers, GNC'd like the info.

SPACECRAFT  How about that, I was just getting ready to push the button to ask you if you wanted to hear those. Ok, when you're ready I'll read them.

CAPCOM      Ready to copy.

END OF TAPE
CAPCOM     Ready to copy.

SPACECRAFT  Okay, stars were 25 and 15, angle error 0.01, the angles reading across the delta X's: -0.03, -0.23, -0.08. Reading across the delta Y's: +0.13, +0.02, -0.11. Delta Z's: +0.13, -0.11, +0.28. Execution time, 5 days, 506:16:36.

CAPCOM     Copy that, thanks. Challenger, Houston, we're going LOS and we'll see you on TDRS in about 4 minutes.

SPACECRAFT  Okay, Mary, talk to you then.

PAO        Mission Control Houston, 5 days, 6 hours, 41 minutes, we have loss of signal through the Hawaii station, we'll pick up in 3 minutes, on the tracking data relay satellite, where we will be getting some television, through the satellite of earth views, downlink television from the Orbiter today. Crew just has a little over an hour, about an hour and 15 minutes, remaining in their day. They are already more than half way into the presleep period, during which they do the last minute clean up items for the day, prepare their evening meal, and consume that, and make sure all the systems are buttoned down, and Orbiter's systems are ready for the night. They'll get to work first thing in the morning, powering up the SPA's and some of its experiments before they begin their pre-EVA activities. We're about 2 minutes away from picking up through tracking data relay satellite. This is Mission Control. Mission Control, we have acquisition through TDRS.

CAPCOM     Challenger, Houston, back with you through TDRS now.

SPACECRAFT  That is not the component, but the pointing will have to be 85 degrees out of point.

CAPCOM     Challenger, Houston. Challenger, Houston, with you through Santigo.

SPACECRAFT  Oh.

CAPCOM     And Vance, if you're not using the bay cameras we'd like to use them.

SPACECRAFT  You can still have them, you want us to, we'll have to look to see, I think we're off, so you want us to go to command?

CAPCOM     That's negative, Vance, you don't have to do anything, we'll just take them over. And also if you have that middeck speaker configuration along with the teleprinter, we have the test message here, and if we don't get it up here it will be a while before we hit a site again.
SPACECRAFT   Yeah, we're just now getting around to presleep, I'm not sure we've got that all set up, just a second. And Mary, did you get the comment about the prop or did we have a drop down.

CAPCOM       Must have dropped out say again.

SPACECRAFT   We were just kidding around up here, Hoot was looking at his RCS, how goes it chart, his OMs chart, and there's so much excess propellant, we figured we will probably have to point about 85 degrees out of plane on the deorbit burn.

CAPCOM       Copy that.

PAO          This is Mission Control, we're getting live television downlink as the spacecraft just about to cross the coast of south America.

SPACECRAFT   Okay, Mary, on the downstairs speaker, we're ready for you to send us a teleprinter message.

CAPCOM       Okay, we copy that. And Challenger, Houston, they're sending you teleprinter message 50 alpha again, through this new configuration.

SPACECRAFT   Okay, 50 alpha.

CAPCOM       Also on your RCA --

END OF TAPE
Okay, 50 alpha.

Also on your RCS how goes it, suggestion, you're going to have a RCS optimum tig, with a 3 minute download. Tank fill coverage, above safe HP, and no waste in angle. And that's calculating it with DTO 403 on flight day 8.

Okay, no wasting angles, good deal.

Roger, and triple down mode, if we don't pick you back up on TDRS after this AGO pass, we'll get you through Ascension, at 7:17. And Challenger Houston, we didn't get that teleprinter message up to you in the new configuration. We'll try to send it to you at Ascension.

(garble)

Challenger, Houston, back with you through TDRS.

Okay, Mary, loud and clear on TDRS.

Got one, couple more presleep activities for you from the ECONs.

Okay, go ahead with them.

First of all on panel L1, we'd like you to take your rad controller out temp to normal, and then take flash evaporator primary A to off and then on.

Okay, Mary, we took the rad out temps to normal, took the FES off and then back to on.

And then we'd like you to go ahead and verify, PPO2, caution and warning for the evening. Channel 34, which is PPO2 alpha at 3.2 volts dc. Channel 44, which is PPO2 bravo, verify 3.1 volts dc. That's the hardware, we'll do the software.

Okay, thanks, Mary, we'll check 34, 3.2; 44, at 3.1, that's the upper limit.

That sounds good. And Challenger, Houston, have a sentence on your CRT 2 problem, well, at least a problem they're trying to work out now.

Okay, go ahead.

First of all, this, there's nothing wrong with GPC 1 and there is nothing here that could cause the fail to sync problem. What they think, if anything is wrong, they're going to track it down to a BCE on DK 2, it's logging the wrong errors.
SPACECRAFT    Say the last sentence again please.
CAPCOM       BCE to DK 2, it's logging the wrong errors.
SPACECRAFT   Okay, understand.
CAPCOM       And Vance, it's logging MSC's instead of initial
time outs they think.
SPACECRAFT   Anyway only indication problem, right?
CAPCOM       That's affirmative, no indication problems at
all.
PAO          And this is Mission Control 5 days, 7 hours, 10
             minutes. We've been getting live television
downlink from the
Orbiter through the payload bay cameras. Orbiter is now over the
South Atlantic having just passed over the lower half of South
America.
CAPCOM       Challenger Houston, with you over Ascension for a
couple of minutes.
SPACECRAFT   Clear at Ascension.
CAPCOM       Got you loud and clear. And looks to us, like you
should have 50A onboard through Ascension using your mid speaker
set up for the evening.
SPACECRAFT   Okay, we'll give it a check, we didn't get anything
through the speaker, so that part must be working.
CAPCOM       That sounds good.
SPACECRAFT   Yeah, Mary, we're right in the middle of getting it
now.
CAPCOM       Copy that.
CAPCOM       Challenger, Houston, we're 30 seconds LOS and we'll
talk to you through Guam at 7+57.
SPACECRAFT   Okay, Mary, we'll see you at Guam.

END OF TAPE
CAPCOM       Challenger, we're 30 seconds LOS and we'll talk to you through Guam at 7:57.

SPACECRAFT   Ok, Mary, we'll see you at Guam.

PAO          This is Mission Control at 5 days, 7 hours, 38 minutes Mission Elapsed Time. Challenger has passed out of the range of the Tracking Data Relay Satellite on orbit #86 and is approaching the continent of India. We have about 20 minutes remaining before the crew is put to bed for the night, completing their activities for the day. Final checks of the Orbiter systems being conducted by the Flight Controllers here in Mission Control, and any necessary adjustments being read up to the crew. This is Mission Control Houston.

PAO          This is Mission Control at 5 days, 7 hours, 56 minutes Mission Elapsed Time. We're about to acquire communication with the Challenger over the Guam station. We're right at the start of the scheduled crew sleep period, so we may not have any communication with the crew. For the last few hours here in Mission Control, the flight planners and flight controllers have been checking on the Orbiter's systems making sure that everything is buttoned down for the night. All the proper limits are set on the caution and warning system that the crew's cabin atmosphere is properly adjusted, fuel cells have been purged, IMUs aligned Lithium Hydroxide cannisters changed out and that sort of thing so that the crew is not awaked by any necessity during the night to change any of those items. Crew's due to get up about 11 pm Central Time and start what promises to be a very busy day with a very busy day with the 2nd space walk of the Challenger's flight.

CAPCOM       Challenger with you through Guam for 5 minutes. Challenger, Houston with you for 4 minutes.

SPACECRAFT   Roger, Mary. Just listening to some music up here.

CAPCOM       And Challenger, just a reminder with your presleep work, that we have not seen a cable-unwrap yet this evening.

SPACECRAFT   No, and probably a few other things too.

CAPCOM       And Challenger, Houston, just one more item, and we'll leave you alone for the evening. We owe you a state vector, we're going to put that up as soon we get TDRS AOS here on rev 86, and that should hold you until rev 91.

SPACECRAFT   Ok, real good, and we received message 50A

CAPCOM       Ok, thanks, we copy, you received 50A And verify that there was no sound or problem with that.
SPACECRAFT  No problem.

CAPCOM  Sounds real good. And Challenger, Houston, we'll tuck you in for the evening with a correction, that state vector we give you at TDRS AOS will be good to rev 93, and hope you have a good night's sleep.

SPACECRAFT  Ok, rev 93. And we'll get that cable unwrapped here pretty quick and finish the rest of the items.

CAPCOM  Copy, good night.

SPACECRAFT  Ok, Mary, you should see that cable unwrapped now.

CAPCOM  Ok, we copy.

PAO  This is Mission Control Houston, at 5 days, 8 hours, 3 minutes Mission Elapsed Time. Challenger passing out of the range of the Guam station on orbit #86. Crew informed that state vector would be shipped up automatically via the Tracking Data Relay Satellite when they come in contact with that satellite's range in about 18 minutes. That gives them the proper onboard guidance navigation for the evening, carry them through the sleep period. The Flight Director Harold Draughon did a status check here in Mission Control with all the Flight Controllers to be certain that they were happy with the way their systems were configured for the night and then CAPCOM Mary Cleave gave the official good bye for the night from this flight control crew at the end of flight day 6. Tomorrow flight day 7 begins for the crew about 11 pm Central Time when they get up and power the Shuttle Pallet Attached Satellite and begin getting ready for their EVA. This will be the 2nd EVA of the flight, the 1st one lasted 5 hours and 55 minutes. This one will be of similar duration beginning at about 5 am Central Time. The highlight of this EVA, in addition to some additional checkouts of the Manned Maneuvering Units, there will be a practice docking with the slowly rotating SPAS --

END OF TAPE
PAO attached satellite and begin getting ready for their EVA. This will be the second EVA of the flight, the first one lasted 5 hours and 55 minutes. This one will be of similar duration, beginning at about 5 am central time. The highlight of this EVA in addition to some additional checkout of the man handling units, there will be a practice docking with the slowly rotating SPAS. The SPAS will be taken out of the cargo bay by the remote manipulator system, the mechanical arm. And rotated at a rate of about 1 degree per second to match the rotational speed that the astronauts would expect to encounter when they go up to repair the solar maximum satellite on the next Shuttle flight. That satellite launched in February 1980, shortly after its launch to observe solar phenomena during the maximum period of the solar cycle, experienced some electronic problems, and it slowly began turning which it eliminated its capabilities as a working observation satellite. The crew will on flight 13, which is actually flight 41-C, will rendezvous with that orbiting satellite, which has been up for four years now, will match its orbit, crewmembers will go out in the MMUs, one crewmember will match up with the rotational speed of that satellite, will dock with it, and use his MMU to slow it's rotation, the satellite will then be grappled by the remote manipulator arm and returned to the cargo bay of the Shuttle where it will be worked on, the main electronics box will be repaired and the satellite will be returned to a useful orbit. We don't expect to hear from the crew again tonight. They are now in their scheduled sleep period and as we left them a few minutes ago, they were listening to some music, and making the final, going through the final activities that they had before they got into the sleep period. Planning team of Flight Director, Larry Bourgeois, is coming on board now, and the handover will be getting under way shortly in Mission Control. That team will be reviewing the planned EVA activities, all the other activities for tomorrow, flight day 7. Making the changes to those, and any changes will be updated via teleprinter messages to the crew tonight. We're at 5 days, 8 hours, 7 minutes, mission elapsed time. This is Mission Control Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead.

SPACECRAFT Roger, surprise, surprise, we just had a fail off on 2 manifold (garble) jets R5R and R5D.

CAPCOM Okay, we're looking at it now. Roger, we saw that Vance, we're looking at it now.

SPACECRAFT That's your selected, and we're on primaries, and just for the moment I guess we'll to that aft jets option.
CAPCOM  Roger, sounds like a good idea, Vance, we're looking at, I'll get back to you in a second.

SPACECRAFT  Okay.

SPACECRAFT  Houston, Challenger.

CAPCOM  Challenger, Houston, go ahead, Vance.

SPACECRAFT  Ah, Guy, we're on the aft jets, and standing by, we, we're looking at the hot fire procedure, in case you want us to do anything like that, so we're standing by.

CAPCOM  Okay, copy, Vance, what we'd like to do for sleep tonight, is just stay on tail only jets, if we hot fire it, then we wouldn't be positive they wouldn't kick off again tonight anyway, so we'd like to just stay where you are, we'll sleep on tail only, and we need to look at the data. It looks like there is a problem in the, one of the redundant power sources to RJD 5 manifold, but the only anominally we'd like from that procedure, is for you to leave the vernier RJD driver on tonight, so we can look at it some more.

SPACECRAFT  Okay, well it's on right now, we didn't turn it off, and so I guess we're in the configuration for you to watch it.

CAPCOM  Roger, Vance, looks good, thank you.

SPACECRAFT  You bet.

END OF TAPE
CAPCOM        -- driver on tonight so that we can look at it some more.

SPACECRAFT   Okay. Well, it's on right now. We didn't turn it off and so I guess we're in the configuration for you to watch it.

CAPCOM        Roger Vance. Looks good. Thank you.

SPACECRAFT   You bet.

SPACECRAFT   And Houston, Challenger.

CAPCOM        Go ahead Vance.

SPACECRAFT   Looks like we've got a minor problem with the WCS in addition to the separator thing that happened earlier. We, it's tending to fill up. We're having a hard time getting --

SPACECRAFT   Houston, Challenger.

CAPCOM        Challenger, Houston back with you Vance. We had a dropout. I copied the WCS minor problem, tending to fill up and then we were cut off.

CAPCOM        Challenger, Houston. How do you read that Vance?

SPACECRAFT   Okay, I think we have you now.

CAPCOM        Okay, Vance. We had tried to get high data rate there to look at the RCS and it apparently didn't work. We're back on low data rate. All I copied on their WCS was he had a minor problem that was tending to fill up.

SPACECRAFT   Tending to fill up, but also the material is tending to come up to a level that's at the bottom of the transport tube. And it's hard to manually move out of the way, with a probe of some kind. Also, we just noticed a short time ago, that the circuit breaker on the slinger on panel ML86 is popped.

CAPCOM        Roger, copy that Vance. Let me see if somebody's got some words for you.

SPACECRAFT   Okay. Well there's another one for you to think about tonight I guess.

CAPCOM        Roger.

PAO          Mission Control Houston. Propulsion Systems Officer here in Mission Control taking a look at an apparent problem in one of the aft verniers. Seems to be a problem that
drive or power on jet RJD5 will not stay redundant, and what they
have done is taken a playback from the system, going over that
data now. They also are sending up a configuration to the ship
that will leave all primary jets in redundancy tonight, and they
will stay tail-driven for the night, take a look at the data. On
that last communication Commander Vance Brand also reporting a
problem with the waste compartment system. One of the circuit
breakers on the slinger popped and they are having a problem
keeping the material where it's supposed to go. At mission
elapsed time 5 days, 8 hours, 51 minutes, this is Mission Control
Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead Vance.

SPACECRAFT Well with the latter problem, we've had some
success. We all flipped coins and Hoot lost, and he took a ply
bar and he said that stuff was sort of like freeze-dried or adobe
consistency or something like that. Anyway, he pried it loose
and now that area is clear in the WCS right below the transport
tube where a slinger is and he wonders if we could reset that
circuit breaker and see if it will spin up, which it should
because it's clear.

CAPCOM Roger Vance, and you have a go for resetting the
circuit breaker and trying it again.

SPACECRAFT Okay.

PAO Mission Control Houston. Commander Vance Brand
reporting that Pilot Hoot Gibson managed to clear the transport
tube in the WCS with a pry bar and mean time EECOM and flight
have given an affirmative on the plan to reset the circuit
breaker and the crew's doing that now. Mission Control Houston
at 5 days, 8 hours, 55 minutes.

SPACECRAFT Okay, Guy. I guess it's all right now. Sorry we
had to bother you on that but it's just something we'll have to
watch in the next couple of days, make sure the problem does not
reoccur.

CAPCOM No problem Vance. And Vance, if the problem
reoccurs you've just got to go to reset the circuit breaker and
try the same, after clearing it out and try the same procedure.

SPACECRAFT Okay. Turns out that slinger is just sort of in
the way since it, well it had a function when they had (garble)
on there I think, but now it's really, maybe not just optimum --
CAPCOM try the same, after clearing it out and try the same procedure.

SPACECRAFT Okay, it turns out that slinger's just sort of in the way since it, well it, had a function where they had times on there I think, but now, it's really maybe not just optimum.

CAPCOM Roger, copy that, Vance, and that's okay, we had, we enjoyed the problem, we got to call Mary back in.

SPACECRAFT Well at least I guess you got a little excitement on the late shift, huh.

PAO And that was Commander Brand reporting almost simultaneously with EECOM down here in Mission Control that the circuit breaker did stay in and CAPCOM Guy Gardner teasing that they had brought orbit 2 CAPCOM Mary Cleave back in to help them troubleshoot the toilet problem.

CAPCOM And Challenger, Houston, just to...

SPACECRAFT Go ahead.

CAPCOM Roger, Vance, just to let you know here and put you to bed, we like the RCS config, looks good, and we'll just stay that way until the morning and you can go ahead and turn the DDU's off.

SPACECRAFT Okay, I'll do that, we'll see you in the morning.

CAPCOM Roger, have a good night sleep.

SPACECRAFT I will.

PAO Mission Control, Houston. Both the propulsion systems officer and GMC reported from a quick look at some of the data playback from Challenger, they were satisfied with the configuration of the vehicle to go on into the sleep shift and that call just went up from CAPCOM Guy Gardner. The printer problem in one of the aft verniers did not wake the crew, they had not gone to bed yet, there were no alarms that would have awakened them. At Mission Elapsed Time, 5 days 8 hours, 59 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. We're still planning to hold our change-of-shift press briefing with off-going Flight Director Harold Draughon at approximately 4:30 p.m. building 2 room 135. At 5 days 9 hours 5 minutes, this is Mission Control, Houston.

PAO And Mission Control, Houston, we're going to delay the change-of-shift briefing from 4:30 to 4:45 p.m.,
approximately, with off-going Flight Director Harold Draughon in building 2, room 135. Again about a 15-minute delay in getting that briefing underway, and we'll try to begin at 4:45 p.m. This is Mission Control Houston.

PAO Mission Control, Houston. Flight Director Harold Draughon has left the control center and we do expect to begin the change-of-shift briefing on time at approximately 4:45 p.m., building 2 room 135. At Mission Elapsed Time, 5 days 9 hours 41 minutes, this is Mission Control Houston.

END OF TAPE
PAO Mission Control, Houston. All quiet aboard the Challenger. All four of the the cathode ray tubes onboard the flight deck of the Orbiter are shut off, and in sleep configuration, indicating the crew has probably hit the sack for the night. The Orbiter is currently in a 156 by 148 nautical mile orbit and right now is at an altitude of 157.2 nautical miles. We're almost two million nautical miles into the flight, having flown approximately 1,970,000 nautical miles thus far. The latest and best numbers we have for the two likeliest prime landing deorbit opportunities for Saturday and Sunday are as follows. For deorbit to Kennedy Space Center on rev 127. The ignition time for the Orbital maneuvering system engines would be at mission elapsed time, 7 days, 22 hours, 18 minutes and on that day, Edwards Air Force Base would also be an available option on revs 127 and 128. For Sunday, deorbit opportunity to KSC on orbit 143, 143, the ignition time would be 3 days, 22 hours, 22 minutes. And here in Mission Control, the mission elapsed time is 5 days, 11 hours, 6 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, now on orbit 39 over north Africa. All quiet here in Mission Control and aboard the Orbiter, Challenger. Right now, we read cabin pressure steady at 10.23 psi in preparation for tomorrow's EVA. And the temperature onboard the Orbiter is about 75 degrees, cabin humidity, 26%. At mission elapsed time, 5 days, 12 hours, 17 minutes, this is Mission Control, Houston.

END OF TAPE
PAO Mission Control, Houston. Challenger now over India on orbit 89. Here in Mission Control the planning team is refining some of the last details for tomorrow's EVA in preparation for teleprinting that message, that wake-up message to the crew at Dakar in a couple of orbits. Today was a day dedicated primarily to activation of the SPAS, shuttle pallet satellite, and the running of some of the experiments aboard that. Also performed maintenance and recharges on the extravehicular mobility units or the spacesuits that the astronauts use. Today also Mission Specialist Ron McNair set a space first of his own, he became the first person to play an instrument, an musical instrument in space, in this case a saxophone. Tomorrow of course we have EVA, and with television coming down through TDRS tomorrow, we will go ahead and cancel the 8:30 a.m. change-of-shift briefing with Randy Stone and go ahead and allow the TDRS TV to come down uninterrupted. And then follow up after the EVA with a press conference with Flight Director John Cox, the EVA flight director, at 11:30 a.m. At Mission Elapsed Time, 5 days 12 hours 34 minutes, this is Mission Control Houston.

PAO Mission Control Houston, we're AOS TDRS east and processing telemetry, all quiet onboard the spacecraft and in Mission Control. Planning to send a teleprinter uplink to the crew at Dakar in about 20 minutes or so, awake in 2 hours and 49 minutes onboard the Challenger. And at Mission Elapsed Time, 5 days 13 hours 11 minutes, this is Mission Control Houston.

END OF TAPE
STS-41-B AIR/GROUND TRANSCRIPT  t311j  040:02:56  2/8/84  PAGE 1

PAO Mission Control, Houston. The mission summary is being checked out here at Mission Control and approved prior to uplink to the crew. Part of their morning news package has already gone up at Dakar. The Orbiter now is on rev 90 over the Persian Gulf area. Mission controllers continue to monitor the vernier jets just before crew sleep period begin. Earlier today, there was an anomaly in one set of verns, referred to as R5R and R5D. Those are small, efficient jets on the back end of the Orbiter and the problem was an intermittent loss of driver power. And the propulsion officer here reports that in the event that those do continue to function in that manner, the work-arounds would be simply to reselect vernier jets or, failing even that, the next step would be to use primary jets. And he reported also that in the event they had to go to primary jets for the remainder of the mission, they're way, way above all the levels of propulsion fuel and that sort of thing that they would need to make that happen. So that if for instance, there were a contingency need to move the Orbiter around during the EVA or anything like that. All of those different contingencies have been taken into account and even with those, they're well above the level of fuel they would need to accomplish the rest of their mission using primary jets alone, so it's not seen as a serious problem. At mission elapsed time, 5 days, 14 hours, 2 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. We're about 30 seconds to acquisition of signal through TDRS over the south Pacific Ocean on orbit 91. A reminder that with all of our television coming down out of the sky tomorrow morning with the EVA going on and a lot of coverage through TDRS, we've canceled the 8:30 a.m. Change of Shift Press Briefing with Randy Stone in order to have that come down uninterrupted and live, and we'll have an 11:30 a.m. Change of Shift Briefing with EVA Flight Director John Cox for you tomorrow in building 2, room 135. At mission elapsed time, 5 days, 14 hours, 44 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston. We're about 10 seconds from acquisition of signal through the Yarragadee tracking station in western Australia and about 7 1/2 minutes from the official end to the crew's sleep shift. Right now, we don't see any signs of anybody up stirring around the cabin and if we stick to the usual plan of operations here, we'll probably not see a wake up call go up until MILA on orbit 92. At mission elapsed time, 5 days, 15 hours, 53 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, we're AOS Orroral Valley, processing data through Orroral. Challenger has now traveled approximately 2 million nautical ...

END OF TAPE
PAO  ...on orbit 92. At Mission Elapsed Time, 5 days 15
hours 53 minutes, this is Mission Control, Houston. Mission
Control, Houston, we're AOS Orroral Valley, processing data
through Orroral. Challenger has now travelled approximately 2
million nautical miles thus far on this journey into space.
Their altitude right now is 156.4 nautical miles, the period of
their orbit is 1 hour 30 minutes and 18 seconds. And we're
standing by for wake-up music probably through MILA at the
beginning of orbit 92. This is Mission Control, Houston, at 5
days 16 hours and 1 minute.

PAO  Mission Control, Houston. The telemetry we're
getting back through Orroral shows us that 3 of the 4 CRTs on the
flight deck are switched to on, indicating that at least some
members of the crew are up and getting ready for their latest
flight day in space. At 5 days 16 hours 5 minutes, this is
Mission Control, Houston.

PAO  Mission Control, Houston. Given the relative peace
and quiet during this last shift, the planning shift, we're again
wondering whether it will be necessary to hold a change-of-shift
press conference with off-going Flight Director Larry Bourgeois
at 12:30 a.m. And are hereby announcing our intentions hopefully
to cancel that event. If anyone takes exception to that, please
call the JSC newsroom or the KSC newsroom and they'll get a
message to us. At 5 days 16 hours 7 minutes, this is Mission
Control, Houston.

(wake-up music)

CAPCOM  Good morning, Challenger.

SPACECRAFT  Morning Houston, good sound by John Denver there.

CAPCOM  We thought that would be a little appropriate EVA
music for you there this morning. I got one note real quick,
Vance, on the RCS problem. We analyzed it last night and it's an
intermittent power failure in the driver to the right manifold 5
jets and we haven't seen it reoccur in the last 7 hours and when
it did happen it would only just drop power off for a few, couple
of seconds and then power would be restored. So we'd like you to
go ahead and reselect the jets and reset the RM and go ahead and
go to verns.

PAO  Mission Control, Houston, that wake-up music, the
theme from....

CAPCOM  ...lost your downlink there, but I see by the item
entries you heard my message.

SPACECRAFT  That's affirm, we were in process of taking care of
it.
CAPCOM        Roger, Vance, and we've got a good downlink now.

PAO          Again that wake-up music, the theme from the
Greatest American Hero, some of the verses in there in honor of
this morning's EVA. This is Mission Control, Houston, at 5 days
16 hours, 24 minutes.

SPACECRAFT   Houston, Challenger.

CAPCOM        Challenger, Houston, go ahead.

SPACECRAFT   Yes, Guy, we're assuming that we're going to run
the mass spec step 6...

END OF TAPE
PAO This is Mission Control, Houston, at 5 days, 16 hours, 24 minutes.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead.

SPACECRAFT Yes Guy, we're assuming that we're going to run the mass spec step 6 from the ZLV X-forward position like we did like last night. Is that true?

CAPCOM Roger, that's affirmative, Hoot.

SPACECRAFT Okay thanks, Guy.

PAO Mission Control, Houston. We do still intend to cancel the 12:30 a.m. Change of Shift Press Conference and we offer you one last chance to voice your objections. If you have any, please call the JSC newsroom or the KSC newsroom and this is Mission Control, Houston.

SPACECRAFT Challenger, over.

CAPCOM Challenger, Houston, go ahead.

SPACECRAFT Positioning? Yes, are we clear to do the Ku-band antenna cable. Over.

CAPCOM Stand by, Bruce.

CAPCOM And Bruce, you're a go for that.

SPACECRAFT Okay, thank you.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead.

SPACECRAFT Guy, we're assuming that we are not going to today, is that true?

CAPCOM That's affirmative, Hoot.

SPACECRAFT Okay, thank you.

CAPCOM And Challenger, Houston, we recommend DAP alpha for the IMU roll.

SPACECRAFT Roger, I'll go back and get it.

CAPCOM Thank you, Vance.
I'm up on that EMU, are you reading me? I'm not reading you on that (garble). Okay, that does it.

Challenger, Houston, for your information, we're uplinking a TDRS state vector for-- to the rendezvous nav for your attitude during the EVA.

Okay, fine.

(garble)

Houston, Challenger.

Roger, go ahead, Hoot.

Hey, Guy, a little bit of good news. I just thought I'd reach back here and check the dump valve and I can open the dump valve this morning.

Roger, understand the supply water dump valve?

Yes, that's affirmative. And what I did, Guy, was I closed the dump isol valve, I turned the dump valve enable nozzle heater on and tried it once just right here at this temperature and it opened so I've, I'm staying in that configuration for the moment, unless you want me to go back.

That sounds like a good idea, Hoot, and we confirm on our data that it's open, we'll rethink all of our thinking from last night here.

Okay.

You just ruined all of our big fancy plans we had.

Yes, I can imagine.

And, Guy, the align is finished. Would you like the data or did you see it?

Stand by, Vance.

Okay, align is finished.

Houston, Challenger.

Roger, go ahead, Vance.

We got the alignment just completed. Would you like the data or did you see it, Guy?
CAPCOM        We got everything, Vance, except we need the star ID's and the angle of separation.

SPACECRAFT   Okay, stars 15 and 55. Angular error is .02 and separation is 72.2

CAPCOM        Roger, copy ...

END OF TAPE
CAPCOM ... Vance except we need the star ID's and the angle of separation.

SPACECRAFT Okay, stars 15 and 55, angular error is .02 and separation is 72.2

CAPCOM Roger, copy Vance and be advised, I think every time Ron talks, we're getting him down here on the air-to-ground.

CAPCOM Challenger, Houston with a note on the water dump.

SPACECRAFT Yes Guy, go ahead.

CAPCOM Okay Hoot, we'd like you to go ahead and dump the supply water tank bravo to 30% and we'd like you to leave the rad controller outlet temp to norm, do not go to high with that.

SPACECRAFT Okay Guy, sounds good. We'll dump tank B to 30%, leave the rad out temp normal.

CAPCOM Rog, thanks.

CAPCOM Challenger, Houston, you can go to auto on the DAP now.

SPACECRAFT Roger, auto on the DAP.

CAPCOM Thank you, Vance.

PAO Mission Control, Houston. The crew has been given a go ahead if they are ahead in their EVA prep timeline this morning to go ahead and depress the airlock as much as a half an hour early to give them a little bit more time to work on the camera D changeout. They're going to take a new camera from the cabin and stick it out of the payload bay where the other payload bay camera D had been. So it's possible we could get slightly earlier than anticipated EVA. That's basically crew option and we'll know more about that as we get closer to it. The crew has been asked to take a look for 3 tropical storms and an interesting volcanic eruption on the globe this morning during their passes around the earth. There are a couple of tropical storms. One's named "Annette", the other named "Willie" in the Indian Ocean west of Australia, both northwest of Australia. The earth observations folks down here on the ground would like to have a look at it from space. There's also a tropical storm due east of Madagascar that they'd like to have a look at. And on an island due east of Madagascar or Union Island, there's a volcanic eruption and lava is flowing into the sea and we'd love to have a look at that also. At mission elapsed time, 5 days, 16 hours, 50 minutes, this is Mission Control, Houston.
STSW-41-B AIR/GROUND TRANSCRIPT t314j 040:05:41 2/8/84 PAGE 2

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead, Hoot.

SPACECRAFT Yes Guy, I'm just watching that supply water dump and although I've got open talkback on everybody, I don't see them dumping. The temperatures are still going up on the nozzles and I don't show his quantity starting down any.

CAPCOM Roger Hoot, we agree. We were seeing the same thing and we're just going to wait a little bit longer here and see if anything starts happening.

SPACECRAFT Okay.

CAPCOM Apparently we had the same funny like that happen on flight 8 so we're looking at it and while I got you, we see the left flight controller power is still on.

SPACECRAFT Okay, we got it, thanks, Guy.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston, go ahead.

SPACECRAFT Okay Guy, we got the mass spec program 4 step 3 at 16 + 54.

CAPCOM Roger, we copy Ron, and I've got a note for you on the Cinema 360 when you want to listen to it.

SPACECRAFT Okay, go ahead, Guy.

CAPCOM Roger, we weren't sure if you had any film left on magazine #3 when you did the 25 mm activity before and if there's not much left, they'd like you just to go ahead and start fresh with magazine 4 for the EVA prep.

SPACECRAFT Okay Guy, that's where we stand. We did complete magazine 3, magazine 4 is loaded for the EVA prep. Also on that subject, I wanted to find out if the Cinema 360 folk wanted some -- had some preference in what they wanted to shoot with the final two magazines. We had a part of one magazine, we've reserved for entry, so we have about one full and a slightly better part of another magazine and a few major items left to go and if they have some preferences, priorities, I'd like to know that. Thus far, I've taken quite a bit of activity, mainly of the middeck crew activity in addition to the PALAPA deploy RMS and some over the shoulder for the pilot to (garble)

END OF TAPE
SPACECRAFT ...I'd like to know that. Thus far I've taken quite a bit of activity, mainly of the middeck crew activity, in addition to the PALAPA deploy, RMS, and over the shoulder for the pilot (garble) and PLT, with 25 mm. So in short I'd like to know their preferences and I can certainly work that. Over.

CAPCOM Roger, copy Ron. And did you finish the activities on the 25 mm lens scenario?

SPACECRAFT No Guy, I didn't do some, but not all. I'm back on (garble) right now. But I do plan to do some 35 mm lens work during the EVA and later on in the flight on flight day 8. Over.

CAPCOM Okay, sounds good Ron, and we'll try to get an answer to you, they would just like to thank you for keeping them updated like you've been doing and a reminder they'd like some shots during the EVA of MMU translation by their 360 out in the GAS can.

SPACECRAFT Oh yes, we plan to do a lot of GAS can work in just a few minutes.

CAPCOM Roger sounds great Ron. And Challenger, Houston. Hoot I've got a note here on the supply dump attempt.

SPACECRAFT Go ahead Guy.

CAPCOM Rog. What happened on flight 8 was we just turned everything off and tried again an hour later and it worked. So right now the temps are getting up, so we'd like you to go ahead and close the supply dump isol valve, turn off the nozzle (garble) and go to high on the rad out, outlet temp.

SPACECRAFT Okay, we'll do that Guy.

CAPCOM Thanks Hoot.

SPACECRAFT Okay, and Guy, you want to leave the dump valve, itself open, is that true?

CAPCOM Roger, Hoot, that's affirmative.

SPACECRAFT Okay, so we've closed the dump isol valve, we're going to turn the heater off.

CAPCOM Roger, thank you Hoot.

PAO Mission Control, Houston. That problem with the water dump is similar to the one we've seen on STS-8 and they'll follow the same procedure they used on that mission. And wait about an hour and try again. We have canceled the 12:30 a.m. change of shift briefing with Flight Director Larry Bourgeois,
and a reminder with FVA television coming out of the sky tomorrow morning, we're going to cancel the Randy Stone...

CAPCOM ...note for Ron.

SPACECRAFT Go ahead Houston.

CAPCOM Roger, Ron, the 360 folks say after you've completed all their predefined activities, feel free to get any shots you think are meaningful.

SPACECRAFT Okay, I think predefined activities equate to middeck scene, flight deck over the PLT's to the (garble) filter and that's all I can recall offhand but okay, I'll make a note of that, thank you.

CAPCOM Roger, Ron, we concur with that, what you just said.

SPACECRAFT Okay.

PAO Mission Control, Houston. To continue, we've cancelled Larry Bourgeois 12:30 a.m. change of shift briefing, we will cancel the Randy Stone 8:30 a.m. change of shift briefing, so the next briefing at the JSC newsroom will be at 11:30 Thursday morning, building 2 room 135, with John Cox.

CAPCOM Go ahead, Vance. Challenger, Houston, go ahead.

SPACECRAFT Roger, in your teleprinter pad here at 5:16:55 you have a note A to A6. I guess every reference to A6 assumes we still had a vernier jet problem when we were on PRCS, is that affirm? So its not applicable here.

CAPCOM I believe that's correct Vance, but let me check with PROP. And Challenger, Houston, Vance, we concur, you should go back to the A1 DAP per the original cap with the verns are working.

SPACECRAFT Okay, and if they ever hiccup again, we'll keep A6 in mind.

CAPCOM Roger, sounds good Vance.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead Vance.

SPACECRAFT Roger, Houston, note yesterday we were flying over Central America and it was a fairly clear day, we got a good view of a volcano down there.
CAPCOM          Roger, sounds good Vance.

SPACECRAFT      It was smoking.

CAPCOM          Roger, that's, they thought you might be able to
get a good shot of that. How -- could you tell if Costa Rica
was clear? Old Franklin's been waiting for a good spaceshot of
that, it always seems to be cloudy.

SPACECRAFT      Yes, it's really an interesting view down there,
lots of ....

END OF TAPE
CAPCOM        Could you tell if Costa Rica was clear? Old Franklin has been waiting for a good space shot of that, it always seems to be cloudy.

SPACECRAFT   Yes, it's really an interesting view down there. Lots of old dead volcanoes in a line down the coast.

CAPCOM        Roger, thanks Vance, I'll pass that on.

SPACECRAFT   And Guy, we got, we probably got the western half of Costa Rica very clearly, the eastern half was cloudy but the part with the volcanoes and all that on the western side was clear as could be.

CAPCOM        Good, thanks Hoot.

PAO           Mission Control, Houston, we're 5 minutes and 30 seconds from loss of signal through TDRS. We'll pick up again through Yarragadde.

SPACECRAFT   Houston, Challenger.

CAPCOM        Challenger, Houston, go ahead.

SPACECRAFT   Bob's been keeping up with our CG status on the RP. He says we have a wide CG offset of +3.5, approximately, right now. I assume that will come down a good bit before entry. CAPCOM        Roger, I certainly hope so, Vance if that's the accurate one. Let me find out for you. And Vance, PROP says we're going to do a RCS DTO out of the right OMS on flight 8, and that'll fix you up, that's day 8.

SPACECRAFT   Okay, flight day 8.

CAPCOM        Rog, that's tomorrow.

SPACECRAFT   Just interesting to note that we carry those large offsets for a long period of time.

CAPCOM        Roger that and we've got about a little over 2 minutes left here on TDRS. The orbit 1 team will pick you up at Yarragadde at 17 plus 26.

SPACECRAFT   Okay, Guy, see you there.

PAO           Mission Control, Houston, at 5 days, 17 hours, 26 minutes, standing by for voice through Yarragadde momentarily.

CAPCOM        Challenger, Houston's with you at Yarragadde for 7 minutes.
SPACECRAFT  Great John, hard at work, we're just looking around right now for a typhoon that is supposed to be out in this area.

CAPCOM  Understand, sounds good. Challenger, Houston, a note for Hoot.

SPACECRAFT  Hello John, go ahead.

CAPCOM  Roger Hoot, just for your information, we would like you to delay the waste water dump. We're going to set up a 1 daylight pass with side sun. We'll give you the data to do that when we come up TDRS. We're going LOS here in 30 seconds, see you on TDRS at 17 plus 57.

SPACECRAFT  Okay John, understand that. We'll hold off on the waste water dump for the side sun attitude, I guess to warm it all up.

CAPCOM  Roger that.

PAO  This is Mission Control, we'll have voice through TDRS momentarily. It's 5 days, 17 hours, 58 minutes mission elapsed time.

CAPCOM  Challenger, Houston, I have a switch down on M032 mike if somebody is there.

SPACECRAFT  Go ahead, John.

CAPCOM  Roger, we need the LEH O2 valve 5 closed, cabin PPO2 is getting slightly high.

SPACECRAFT  Okay, the bleed end is turned off, valve 5 is off.

CAPCOM  Thank you very much.

SPACECRAFT  And Houston, Challenger.

CAPCOM  Roger, go ahead.

SPACECRAFT  (garble), a little note here for people that are interested in the subject of debris in the cabin. We don't have hardly any problem at all with that. We find there's no dust or anything, about the only thing that causes any debris that I've noticed is in the huevos.

END OF TAPE
SPACECRAFT  We don't have hardly any problem at all with that, we finde there's no dust or anything. About the only thing that causes any debris that I've noticed is huevos rancheros, certain foods. And we do our best to keep those under control. And bread.

CAPCOM  Roger, we understand you have many people in the control center laughing.

PAO  This is Mission Control, Houston. That note about the O2 referring to the mixture of oxygen and nitrogen in the cabin, it was slightly oxygen rich and the CAPCOM John Blaha instructed the crew to turn back the oxygen moisture a little bit.

CAPCOM  Challenger, Houston, I have the attitude which we promised you at Orroral.

SPACECRAFT  Okay, ready to copy.

CAPCOM  Roger, Vance, for port side Sun, target 4, body vector 5, pitch 0, yaw 270, omicron 90, DAP A auto vern, initiate track at 18 plus 10 in 7 minutes. The next item will be to delay the maneuver to track TDRS, scheduled for 19 plus 00 until 19 plus 20. And before you do that maneuver, enable the rendezvous nav per the CAP update message 51 bravo.

SPACECRAFT  Okay, that was real clear John. That is for port Sun to warm up the supply vent. Target 4, body vector 5, pitch 0, yaw 270, omicron 90, A auto vern, start the maneuver at 18:10, delay the TDRS track maneuver scheduled for 1900 to 1920 and don't forget to enable rendezvous nav with the SPEC 33 item 1, and we understand that you have the TDRS vector into rendezvous nav.

SPACECRAFT  That's affirmative Vance, good read back.

PAO  This is Mission Control, Houston. The guidance navigation and control officer affirming the flight director that the Challenger is in a side sun configuration presently. And this to provide thermal heating. Mission Elapsed Time, 5 days 18 hours, 28 minutes.

CAPCOM  Challenger, Houston, I have a troubleshooting procedure for the supply water dump when you're ready to copy.

SPACECRAFT  Ready to copy John.

CAPCOM  Roger, Hoot. At 18 plus 50, we would like you to take the supply water dump valve enable nozzle heater to ON, and the waste water dump valve enable nozzle heater to ON.
SPACECRAFT: Okay, John, copy. At 18 50 turn the supply water dump enable nozzle heater ON and also the waste water dump enable nozzle heater ON.

CAPCOM: Roger, that. And at 19 plus 20, take the supply water dump isol valve to open and then check the tank bravo quantity decreasing.

SPACECRAFT: Okay, 19 20 we initiate the dump, dump isol valve open and watch water tank B decreasing.

CAPCOM: Roger, and that's with the supply water dump. If, no dump, take the supply water dump valve enable nozzle heater to OFF and the supply water dump isol valve to close.

SPACECRAFT: Okay, copy that, if it does not dump, we'll take the dump enable nozzle heater to OFF.

END OF TAPE
CAPCOM ...OFF and the supply water dump isol valve to close.

SPACECRAFT Okay, copy that, if it does not dump, we'll take the dump enable nozzle heater to OFF OFF and we'll close the dump isol valve.

CAPCOM That's affirmative and the next step to follow with that if no dump, is to perform the waste water dump per the message 54. Challenger, Houston, we are back with you, we had a temporary drop out of comm.

SPACECRAFT Houston, this is Challenger, over.

CAPCOM Roger, and go ahead Bruce.

SPACECRAFT We're standing by for a biomed check. Should be beginning to get biomed on EV 1 now.

CAPCOM Stand by one Bruce, I think we're not able to see it because we're in low data rate.

SPACECRAFT Okay, we're sort of hanging here waiting for the check.

CAPCOM Roger, looks like we won't be able to see it until Orroral Valley which will be in about 25 minutes.

SPACECRAFT Okay, thank you.

CAPCOM Hoot, if you have a second, I'd like to continue with the supply water dump troubleshoot.

SPACECRAFT Okay, yes, go ahead John. You started to say the part about if no dump, we go dump enable off isol valve closed, go ahead and perform the waste water dump and I think you were going to say per message 54 also.

CAPCOM Roger, you have it, that is correct and let me tell you what to do if dump is successful. If dump is successful with the supply water, we would like you to dump tank bravo to 30 percent. And then take the waste water pump isol valve enable nozzle heater off.

SPACECRAFT Okay, I copy. If I get a good dump out of water tank bravo, the supply tank, I'm going to dump him to 30 percent and I will take the waste water dump enable nozzle heater off. Do you do want that taken off when I see that I've got a good dump or when I finish dumping water tank bravo?

CAPCOM Roger, when you see you have a good dump going,
take the heater off, and we'll come back and get the waste water after this supply water dump is complete.

SPACECRAFT Okay, I copy that John, I guess we're trying to use a little bit of the extra heat maybe from the waste dump to help warm up the supply dump?

CAPCOM Negative, we were just getting it heated up in case we had to do the other mode.

SPACECRAFT Okay, copy that, thanks John.

CAPCOM Roger that, Hoot. Challenger, Houston, we're sending you up a new state vector update and also be advised that guidance has computed your Y CG and it is plus 1.5. Y CG plus 1.5.

SPACECRAFT Okay, we copy, plus 1.5, and all the things onboard, the HP41 and the CG wheel gives us a different number but I guess we can talk to you about that later.

CAPCOM Roger, we're convinced our number is correct but I understand what you said and we have a new target state vector coming up.

SPACECRAFT Okay, copy.

END OF TAPE
CAPCOM  Challenger, Houston, we're going LOS TDRS here in two and half minutes. We will not have any comm at Yarragadee so that we can configure ourselves to insure we will be able to get comm and biomed at Orroral Valley at 19 plus 10.

SPACECRAFT  Okay John, we copy that. We'll see you at Orroral at 19:10.

CAPCOM  Roger that.

PAO  This is Mission Control, Houston. We're just about out of range of the TDRS satellite on orbit 93. Next comes Yarragadee in 12 minutes; however, Yarragadee's a UHF voice only station and the crew is preparing the EMU's, the extravehicular mobility units, for today's EVA and the EMU comm system is UHF, and because of the way that system is configured right now, we're not going to be able to talk to the crew through Yarragadee. There'll be S-band voice available through Orroral in 21 minutes. And that'll be our next acquisition of signal. Mission elapsed time, 5 days, 18 hours, 49 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston is with you at Orroral for 2 1/2 minutes.

SPACECRAFT  Roger Houston and do you have a PET time for us, a time zero?

CAPCOM  Negative, we're trying to sync that up, we'll get you that data.

SPACECRAFT  Okay, you might give us a couple of other minor times to go with that too, earlier in the prep. And we're ready to check (garble).

CAPCOM  Roger, we're ready for the data now.

SPACECRAFT  Okay, stand by, we'll get hooked up.

SPACECRAFT  Houston, Challenger, I've got high temperatures showing up on the waste water dump ...

END OF TAPE
STSG-41-B AIR/GROUND TRANSCRIPT t320j 040:08:11 2/9/84 PAGE 1

SPACECRAFT Houston, Challenger, I've got high temperatures showing up on the waste water dump nozzle and also getting high on the supply water dump, do you want me to press on with the dump?

CAPCOM Roger, you can turn the waste heater off with the temperature you have and we're going LOS in 30 seconds.

SPACECRAFT Okay, did you see biomed?

CAPCOM We're looking at the biomed data. Challenger, Houston, the biomed data looks good, we'll see you...

SPACECRAFT (garble) shortly

CAPCOM Biomed data looks good, we'll see you TDRS, 19 plus 34.

SPACECRAFT Roger, John.

PAO This is Mission Control, Houston. We're out of range of Ororal, data shows that both EMUs number 1 and 2 are powered up and voltage levels and current flow pressures all look nominal in those units. We'll have TDRS voice in 19 minutes, this is Mission Control Houston, at 5 days 19 hours 15 minutes, Mission Elapsed Time.

PAO This is Mission Control, Houston. We're in a side sun attitude which doesn't contribute to a good signal strength through the TDRS due to antenna pointing difficulties. The attitude was called for in order to provide thermal heating to the side of the Orbiter which has the water stowage tank B, for bravo, tank valve which has been inoperative due to a -- a valve which we suspect may be inhibited by a plug of frozen ice. The side sun attitude is intended to melt that plug and as yet has not done so. We've tried to dump water during this pass and were unsuccessful in doing so, accordingly it looks like we'll be using the flash evaporators to purge tank bravo again later today. Mission Elapsed Time is 5 days 19 hours 46 minutes. The INCO is looking at means of providing alternate communications methods with the Orbiter right now and we'll stand by to see what kinds of success he has, this is Mission Control, Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Challenger, Houston speaking.

SPACECRAFT Okay, John, I got you. We bumped into a little snag on bringing the SPAS to internal power, step number 5 on the payload ops, page 6-9. We set the power mode to internal and we're looking to see the DHS time reset to zero and start counting over again and it has not done that. From the looks of
the amps on the battery volts, we're seeing 7.5 amps, it looks to us like he's on internal power but like I say, we don't get that reset.

CAPCOM    Understand Hooter, we'll try to get an answer from the payloads folks for you.

SPACECRAFT  Okay, thanks. And John, we're holding right here until we get a go to proceed from you.

CAPCOM    Hoot, the payloads people advise they think an item 2 on SPEC 221 will help you.

SPACECRAFT  Okay, I think we hit that on step 6.

CAPCOM    Hooter, they'd like you to go ahead and execute an item 2 on SPEC ....

END OF TAPE
CAPCOM ... 221 will help you.

SPACECRAFT Okay, I think we hit that on step 6.

CAPCOM Hooter, they'd like you to go ahead and execute an item 2 on SPEC 221 now.

SPACECRAFT John, you cut out. They want us to go ahead and do that item 2 now?

CAPCOM Affirmative.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Yes John, you cut out on that last transmission. They want us to go ahead and do the item 2 now?

CAPCOM That's affirmative, do the item 2 now. Challenger, Houston, thanks a lot it worked, the Payloads people say.

SPACECRAFT Okay, it has not reset our DHS time.

CAPCOM Understand Hoot, Payloads is looking at it.

CAPCOM Challenger, Houston, it looks good to us, no problem, you can continue Ops normal.

SPACECRAFT Okay, great, thank you, John. We're continuing.

CAPCOM Roger that Hooter, and you just got a message 63 up which just provides some changes to the mass spec detach procedures as you had them yesterday.

SPACECRAFT One and two, IV 1, how do you read?

SPACECRAFT John.

CAPCOM Okay, we'll take that message in just a second,

CAPCOM Roger.

CAPCOM Challenger, Houston, for the EVA folks. Challenger, Houston for the EVA guys. Challenger, Houston through TDRS for the EVA guys.

SPACECRAFT Hey Jerry, this is Bob, go ahead.

CAPCOM Okay Bob, you're down in the mud a little bit. We've got a suggestion for you on how you might make your boots more compatible with the foot restraints if you're interested.
SPACECRAFT    Stand by a minute, we're already suited up, Jerry.

CAPCOM      Okay, copy that. We could perform the procedure, Bob, if you’re not pressurized yet.

SPACECRAFT  Okay, we're not pressurized but stand by just a second. Okay Jerry, go ahead with your procedures.

CAPCOM      Okay Bob, your option, one suggestion is just to have Bruce help you get your feet into the stirrups. The second option would be to use some string out of the sizing kit to cinch down the toes of your boots so that you have some clearance to get into the stirrups, over.

SPACECRAFT  Jerry, I think it's a little late for that and I'm really not sure that would, we could do that. Let me just, I'll just fight with it today. Just tell the surgeon to look for small heart rates again.

CAPCOM      Roger that and I think probably the best thing to do at this point, Bob, is if Bruce is handy at the time you're trying to get in or out, he can probably help you.

SPACECRAFT  Jerry, advise where we are in the timeline now, we're just connecting the waist rings in the airlock.

CAPCOM      Okay Vance, copy that. And you had a question about time when we were going to start the PET. We would like you to go ahead and try to get out a half an hour early if you can per the message we sent you. We don't really care how we sync up PET. The reason for getting out early is to make sure we initiate the first MMU flying with the sun.

SPACECRAFT  Okay, I think the approximate nominal PET was 2200 hours. We'll get out as soon as we can but not to exceed a half hour before that.

CAPCOM      That sounds good to us. And Vance, can you advise, do the guys have their biomed circuitry hooked up?

SPACECRAFT  Yes, they sure do. Matter of fact, you ought to be able to see it. They're hooked up for about 3 or 4 minutes.

CAPCOM      Okay fine, we're low data rate right now but we'll be looking when we get back to high data rate. Thank you.

SPACECRAFT  What do you say we shoot for PET at 21:30?

SPACECRAFT  Want to set up the CAP and cover the checklist and all that?

END OF TAPE
CAPCOM  Roger, Hoot. If you're over by L1, we'd like you
to go ahead now and take the rad controller out temp to normal
and the FES to off and then we will -- then you can go ahead and
operate the FES per the water survey right with the timeline and
then later in the day we'll, we'll go back to boiling the water
with the FES.

SPACECRAFT  Okay, good deal, thanks John, that was a very
timely call.

CAPCOM  Roger. Challenger, Houston, a note on the SPAS.

SPACECRAFT  John, we have the SPAS activated, the RS completed
and everything's going well with the SPAS.

CAPCOM  Roger, understand. You may check that the 3 steps
at the bottom of page 6-9 in the payload ops checklist are
completed.

SPACECRAFT  Stand by John, I'll check that. Hey, Houston, yes,
we got those steps John, we got them long ago.

CAPCOM  Understand, we were just looking at a little bit of
hazy data on that but thank you for the call.

SPACECRAFT  Okay, John, thanks for looking over our shoulder.

CAPCOM  Challenger, Houston, a note for you again reference
the SPAS.

SPACECRAFT  Go ahead John, ready to copy.

CAPCOM  Okay, we would like you to repeat the 3 steps at
the bottom of page 6-9.

SPACECRAFT  Okay, we'll go and do that.

CAPCOM  Roger.

SPACECRAFT  Okay, John, John, I guess in order to do that,
those are the, the panel closing out the standard switch panel?

CAPCOM  That's taking the SPAS, right over on LL2 Hoot,
taking the SPAS external power to off, and then the panel ACTV to
off and then the circuit breaker switch power to open.

SPACECRAFT  Okay John, to do any of that, we need to close the
circuit breaker and do that and I will go and hit those switches.

CAPCOM  Your absolutely correct Ron.

END OF TAPE
SPACERCAFT What do you say we shoot for PET at 21 30? You want to set up the CAP, or the checklist, and all that? You want to mark that in the checklist and all that, or what?

SPACERCAFT Not right now.

SPACERCAFT Okay.

CAPCOM Challenger, Houston, Hoot, EECOM would like you to do some switches for him on the waste water closeout.

SPACERCAFT Okay, go ahead John.

CAPCOM Roger, he'd like you to take the dump valve enable heater to on, the dump isol valve of the waste water to close and the dump valve to open in that sequence.

SPACERCAFT Okay.

CAPCOM Thanks a lot Hoot.

SPACERCAFT Okay, John, that was turn the heater on first, check the dump valve closed -- give that sequence to me again.

CAPCOM Okay, take the dump valve heater to on and then the dump isol valve to close, then the dump valve to open on the waste water. And then we want to stay in that configuration until we tell you differently.

SPACERCAFT Okay, you want to leave the heater running then.

CAPCOM That's affirmative and we'll turn it off in a little while after it's warmed up.

SPACERCAFT Okay, and John, and if we don't have you and if it gets to 300, shall I turn it off?

CAPCOM That's affirmative Hoot.

SPACERCAFT Okay, will do.

CAPCOM Challenger, at your convience, we would like you to perform the 10.2 cabin maintenance using N2 makeup only.

SPACERCAFT Okay, you want an N2 makeup, we'll get that when we can John.

CAPCOM Roger, that. Challenger, Houston, I have a note for somebody reference the FES, when you have a second.

SPACERCAFT Okay, go ahead John.
SPACECRAFT: Okay John, to do any of that, we need to close the second breaker and do that and I will go and hit those switches.

CAPCOM: You're absolutely correct, Ron.

PAO: This is Mission Control, the RMU systems officer indicates that...

CAPCOM: Roger, thank you very much and we see the power off.

PAO: The RMU systems officer reports the data shows that the Remote Manipulator System has been activated and rolled out of its cradle. Mission elapsed time, 5 days, 20 hours, 10 minutes.

SPACECRAFT: Houston, Challenger, do you have any TV?

CAPCOM: Negative, we do not.

SPACECRAFT: Okay, got ya. We got a bunch of TVs up and we're getting ready to bring the arm out and then bring the SPAS out.

CAPCOM: Challenger, Houston, we are go for TV now.

SPACECRAFT: Okay, got (garble) cooling, Bob, Bruce. It's easier this way.

SPACECRAFT: Alright.

SPACECRAFT: Strings are covered. Wrist rings and waist rings are covered. Checked it. Okay, we'll leave the comm the way it is for the moment, H2O off, verify that and then it verified power SCU, SPAS fan on, (garble) comm VOX, verify both purge valves that you have on each suit closed and locked. Okay, the arm's coming out and Camera 360's rolling. Put O2 actuator to press and check seat pressure 4.2 to 4.4. Okay, go to O2 actuator IV and I'll time you 1 minute. We'll stop at 1 minute. Mark, one minute. Very good, we're going to start the purge, (garble). Put the actuator to press, then purge valve open.

CAPCOM: Challenger, Houston for the flight deck guys.

SPACECRAFT: Okay Jerry.

CAPCOM: Roger, Ron, we'd like you to go over to SPEC 77 and read us down the MMU temps if you would, please.

SPACECRAFT: Okay, stand by John. Okay Jerry, the MMU temp left for the port +46; starboard, +41; right, +38 for the port; +42 for the starboard. Over.
CAPCOM: Roger, Ron, could you just read us down the 4 columns there on both of them, please.

SPACECRAFT: Okay, we'll get the 4 columns. The port column, you have a +95, +100, +46, +39, +40, +36, +59. For the starboard, +109, +111, +41, +43, +40, +40, +59. Over.

CAPCOM: Roger, we got those, thank you Ron. Challenger, Houston for Bruce and Bob.

SPACECRAFT: Houston, Challenger. Okay go ahead, Jerry.

CAPCOM: Okay Bruce, we listened to some of the ICOM debrief after the first EVA. We were not able to determine if you, Bruce, had ever got any hard docks with the T-pad, over.

SPACECRAFT: That's affirmative on the CESA, second dock was a hard dock and I went into the (garble) stabilization mode, fired roll thrusters to verify that it was on there and it really rocked you back and forth pretty violently and it held very nicely.

CAPCOM: Okay, copy that and do both of you ...

END OF TAPE
SPACECRAFT: I went into the stat stabilization mode fired, roll thrusters to verify that it was on there and I really rocked it back and forth pretty violently and it held very nicely.

CAPCOM: Okay, copy that and do both of you intend to do at least one of those today?

SPACECRAFT: Yes, we'll probably get at least one up on the SPAS.

CAPCOM: Okay, that sounds good.

SPACECRAFT: I don't know for me, Jerry. It that takes time for the docking, so.

CAPCOM: Roger, Bob, I under...

SPACECRAFT: (garble)

CAPCOM: Understand. We want to make sure we at least get one, it would be good if each of you had one.

SPACECRAFT: Yes, understand.

SPACECRAFT: And Houston, Challenger.

CAPCOM: Go ahead, Vance.

SPACECRAFT: Thought I'd bring you up to date. We're in the 8 minute purge, they'll be going into prebreathe fairly shortly. Since we're venting gas into the cabin, I don't suspect we'll need to pump it up with N2 in addition, but, maybe you can take a look after the purge is finished to see.

CAPCOM: Okay, we won't be with you quite that long, Vance, we're 4 minutes to LOS. And Challenger, Houston, if you're ready, we'd like to go ahead and perform the comm check before we go LOS.

SPACECRAFT before LOS?: Roger, stand by. Okay, how much time you got

CAPCOM: It says 3 and a half minutes, Vance.

SPACECRAFT: Okay. Bruce, put your comm to bravo, Bob, yours to alpha, then I'll turn off the switch and we'll make a comm check.

SPACECRAFT: you copy?

CAPCOM: Okay, Houston, this is EV2 in mode alpha. How do readable.

CAPCOM: Roger, Bob, got you clear, somewhat in the mud but
Spacecraft: Okay, Houston, this is EV1, I'm in mode Bravo today.

Capcom: Okay, Bruce, you are loud and clear, Bob is still somewhat down.

Spacecraft: Okay, how about now.

Spacecraft: Please, please make another check with Bob, I didn't have the airlock audio power off when he made his check.

Spacecraft: Okay, Jerry, how do you copy now.

Capcom: Okay, Bob, that sounds great, thank you.

Spacecraft: Okay.

Spacecraft: Okay, and how are you reading me now, Jerry.

Capcom: Okay, Vance, I got you loud and clear also.

Spacecraft: Yes, I turned airlock audio power back on, and good check.

Capcom: Roger, that.

Spacecraft: You want us to go back to the hardline Vance?

Spacecraft: Yes, it's probably a good idea.

Spacecraft: Okay.

Spacecraft: And you're coming up on 6 minutes of purge, a couple or 3 minutes more, then will go to prebreathe.

Spacecraft: Houston, Challenger.

Capcom: Go ahead.

Spacecraft: A little bit of RMS information, we got. When I was maneuvering the arm up to overhead the SPAS, it wasn't responding exactly the way I...ought it ought to and we got enab light on this electronics and on SPEC 96, we have enab STA in wrist yaw. And looking out the window, it may be that that was what I was seeing was that the wrist yaw I don't think was following what we were asking for.

Capcom: Okay, Hoot, we concur with that, we'd like you to perform MALF 13.1 Charlie.

Spacecraft: Okay, that's where we are.
CAPCOM       And we're 40 seconds to LOS guys, Hawaii next at 21
            05.

SPACECRAFT  See you in Hawaii.

SPACECRAFT  Hey, Jerry, do we still have you?

CAPCOM       Just barely.

PAO          This is Mission Control, Houston. We're LOS from
            TDRS, we'll pass over the Yarragadee sites but because of
            the UHF configuration for the EVA, we will not have UHF
            communications through Yarragadee. Next AOS will be through
            Hawaii on the ascending node of orbit 95, in about 35 minutes.
            And RMU systems officer here in the control center shows data...

END OF TAPE
PAO  ... Hawaii on the ascending node of orbit 95 in about 35 minutes. And the IMU systems officer here in the Control Center shows data indicating that the crew has the Remote Manipulator System heated up and operating. Suit checkout, voltage levels, pressures, communications check, all going well. And the EVA crew looks to be about 50 minutes ahead of their timeline so far and anticipating EVA may begin about 30 minutes earlier than originally planned.

SPACECRAFT  Let's make a check on what you're taking out, TV's and, it's in our bag. We have the 35 mm MMU camera with cable. Okay, it's there, 35 mm handheld camera with brackets, MMU battery transfer bag with new batts,

SPACECRAFT  those are (garble) extenders.

SPACECRAFT  ... flashlight. Okay, and in case you have the TV in there for a location, (garble). The large or small trash bag inside airlock. There's the (garble).

SPACECRAFT  Houston, Challenger, you with us?

CAPCOM  Roger, Challenger, just got you.

PAO  This is Mission Control, Houston. It looks like we may have just lost it again. There's a brief keyhole in this pass in Hawaii and we're now processing data again and should have voice in just an instant here. MET is 5 ...

CAPCOM  Challenger, Houston in Hawaii.

SPACECRAFT  Hey Houston, we have you loud and clear and we're holding to go out until we've got the ...

CAPCOM  Roger.

SPACECRAFT  Okay, yes, Jerry. With respect to the RMS, we've been holding since we last talked to you which was a long time ago. We have gone through MALF 13.1 charlie, went through box 1, 4, 7, 8. Box 16, the answer was a no, the (garble) does not drive in single, and we got to box 17 and we're holding on that caution before going to block 21, if you want us to do that.

CAPCOM  Okay, stand by. Challenger, Houston, for Hoot.

SPACECRAFT  Go ahead, Jerry.

CAPCOM  Okay, I've got a series of switch throws for you here. What we're essentially going to do is cycle power on the arm. First one is RMS select to off, RMS power to off, power to primary, select port, SPEC 94, item 5 execute and cancel safing.
SPACECRAFT  Okay Jerry, we just went through the power cycle and the ABE light comes back to us.

CAPCOM  Okay, stand by.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Vance.

SPACECRAFT  If you think we'd like to get everybody going out the hatch about the same time independent of the RMS problem, why we'll proceed on with that.

CAPCOM  Roger Vance, we're go for EVA.

END OF FILE
SPACECRAFT  Houston, Challenger.
CAPCOM  Go ahead Vance.
SPACECRAFT  If you think we'd like, like to get everybody going out the hatch about the same time, independent of the RMS problem, we'll proceed on with that.
CAPCOM  Roger Vance, we're go for EVA.
SPACECRAFT  We'll get the control checkout a little later.
CAPCOM  Roger. Challenger, Houston, we're 35 seconds to LOS. We are electing not to do any further checkout of the arm, we'd like you to cradle it please. We'll see you at TDRS in two minutes.
SPACECRAFT  Okay, and Jerry we'll cradle the arm, that's what we were expecting to hear, I'm afraid.
CAPCOM  Roger, that.
SPACECRAFT  Okay, how do you read, Bob?
SPACECRAFT  Loud and clear.
SPACECRAFT  And I read loud and clear.
SPACECRAFT  John. I'll look around once more and make sure there anything loose.
SPACECRAFT  Bruce, what does this battery bag attach to?
SPACECRAFT  It's attached to your wrist tether and also it's snapped to that strap on the top of the arm. It won't go anywhere.
SPACECRAFT  Okay, Bruce and Bob, I don't see anything in the airlock that shouldn't be there, do you?
SPACECRAFT  No.
SPACECRAFT  Looks good.
SPACECRAFT  Okay, I'm going to close up the inner hatch, have a good EVA there.
SPACECRAFT  Roger.
SPACECRAFT  Turn us upside down first.
SPACECRAFT  Again.
Turn us upside down so that we're in position.

Oh, okay.

We won't need the airlock open to do that.

This is Mission Control, Houston. There's an apparent failure on the RMS wrist yaw motion capability which has...

Would you move that battery until I see where my foot is going to go. Thank you.

That failure has induced the systems officer here to instruct the crew to cradle that arm and RMS operations for this EVA are accordingly in severe jeopardy unless some kind of a workaround can be devised. The EVA crewmen are in the hatch and they're transmitting on their UHF...

Okay, I'll start my feet out the door here and I want to end up facing the inner hatch door.

With those EVA crewmen in the airlock and transmitting on UHF, we'll get constant communication from them as an artifact of this comm configuration.

(garble) looks good.

Bruce, can you lean up toward the hatch a bit?

Yes. Did that help?

Yes.

Hey, Vance, you're not in -- open the door (garble) is all the way on.

Challenger, Houston...in the blind UHF.

Hooter, we're not getting (garble).

Put her way back in the (garble) once again

You're loud...

...go to C3.

Okay.

S-band
SPACECRAFT  Open them all the way

CAPCOM  ...switch, we'd like you to take the rotary to different antennas and then (garble) it over with (garble) forward checking uplinks full strength on F9 meter.

SPACECRAFT  You're going to have to open it all the way. The latch, cycle the latch handle all the way over. Okay, that's got it.

SPACECRAFT  That's not where you want it to, Bob.

SPACECRAFT  It's all the way.

END OF TAPE
SPACECRAFT ... the latch. Cycle the latch handle all the way open. Okay, that's got it.

SPACECRAFT That's not where you want it to, Bob.

SPACECRAFT It's all the way.

PAO This is Mission Control, Houston. Once again, RMS checkout operations reveal the failure ...

SPACECRAFT Thank you.

PAO A failure in the RMS wrist joint and the range of motion for yaw mechanism. That failure has induced the Control Team to instruct the crew to cradle the arm and RMS operations for the day's EVA are in jeopardy.

SPACECRAFT Houston, how are you reading Challenger?

CAPCOM Roger, Challenger, we're reading you loud and clear. We still have a TDRS uplink.

SPACECRAFT Okay, Jerry in the auto position, not getting any appreciable signal strength (garble) is roll her up forward.

CAPCOM Copy, lower left forward, Hoot. And Challenger, Hoot, we would like to go back to lower right forward and no joy, return to lower left forward.

SPACECRAFT Okay, let me try that.

SPACECRAFT Okay, I've got an egress, did you get that?

SPACECRAFT Okay.

SPACECRAFT I mean the depress cue card.

SPACECRAFT Okay, how much prebreathe time has elapsed?

SPACECRAFT Okay, Houston, it looks like over right forward's going to work.

CAPCOM Roger, thank you Hoot.

SPACECRAFT 49 minutes.

SPACECRAFT How much?

SPACECRAFT 9 minutes.

SPACECRAFT 49? Pour niner?
SPACECRAFT Four niner.

SPACECRAFT Okay Ron. Airlock depress valve to 5 if you would please, sir.

SPACECRAFT Okay, we're depressing.

PAO This is Mission Control, Houston.

CAPCOM Challenger, Houston through TDRS.

SPACECRAFT Roger, John, we got you. Roger Houston, Challenger and we're into the depress. We got 49 minutes of prebreathe done.

CAPCOM Okay Vance, copy that and a note for the EVA. We would like to conduct the nominal EVA timeline with all the dockings with a T-pad to be conducted in the cargo bay using the SESA and or the SPAS through preference.

SPACECRAFT Okay. Okay, we copy.

CAPCOM And further on that Vance, if the guys are ready to go out a little before the half hour mark, that's your choice. Whatever you would like to do.

SPACECRAFT Okay, very good.

SPACECRAFT 5.3. We want to stop at 5, 5.2, 5.1, 5. Close the valve.

SPACECRAFT Closed.

SPACECRAFT Okay status leak check.

SPACECRAFT (garble) you got that 02 off?

PAO This is Mission Control, Houston, 5 days, 21 hours, 20 minutes. Looks like there is no hope for RMS operations today. That last advisory to the crew to conduct a nominal timeline, but the docking and trunnion pins is going to take place in the cargo bay and not with the SPAS deployed on the arm, or the RMS. Again, the RMS has experienced a failure in the wrist yaw mechanism and RMS operations for today are no go.

SPACECRAFT Leak check complete (garble) to the EVA? (garble) in the EVA?

SPACECRAFT (garble) EVA.

SPACECRAFT Okay Vance, whenever you want to start the PET
clock, we're ready to go power to battery. Give us a call.

SPACECRAFT  Okay.

SPACECRAFT  Got to pick some convenient minute or something.

SPACECRAFT  Yes, we'll start at about a minute or two from now, stand by one.

SPACECRAFT  Okay.

END OF TAPE
SPACECRAFT Ready to go power to battery if you give us a call.
SPACECRAFT Okay.
SPACECRAFT Got to to pick something minute or something.
SPACECRAFT Yeah, we'll start at about a minute or two from now. Standby one.
SPACECRAFT Okay.
CAPCOM Challenger, Houston. We're getting TV now from the cargo bay.
SPACECRAFT Roger, Jerry. Copy that. We're positioning to watch the egress.
CAPCOM Roger, Ron.
SPACECRAFT And Jerry, we'll have set PET to be 5 days, 21 hr, 24 min, if that's okay with you.
CAPCOM Roger. Copy 21:24, Vance, and that's fine with us.
SPACECRAFT Okay, EV1 and 2, we'll be starting up PET and swing on those battery switches in roughly 30 sec.
SPACECRAFT Okay.
SPACECRAFT Okay. 8 sec away. (Garble) switches on. 4 3 2 1 mark. Get that?
SPACECRAFT (Garble) battery. Okay. (Garble) power battery charger EMU 1 2 plus select, both of them to off, please.
PAO Mission Control, Houston. The Extravehicular Mobility Units are now on internal power.
SPACECRAFT 02 (garble) both to off, please.
SPACECRAFT 02's off.
SPACECRAFT Okay. Disconnect SCU stow and close your D&C cover.
SPACECRAFT (Garble).
SPACECRAFT Hey, I'm in the process of doing this one over here on the handrail.
CAPCOM And Challenger, Houston. We're getting a nice picture of the flightdeck.
CAPCOM  And Hoot, we'd like one clarification on the power.

SPACECRAFT  Time for a status check. Vance, do you want to complete status check readout at this point, or just --

SPACECRAFT  Okay, complete one before you go out, let's get it here, and, Bruce, why don't you start out?

SPACECRAFT  Okay.

SPACECRAFT  Be copying.

SPACECRAFT  Airlock pressure, 5.2.


SPACECRAFT  Go ahead, Houston.

CAPCOM  Roger, Bruce. We'd just as soon get that status check after you are at vacuum and the water is on.

SPACECRAFT  Okay.


SPACECRAFT  Okay. Abbreviated check, EV1 looks good.

SPACECRAFT  EV2 has a 2 min EV time left 6:50, 99 percent power, all 4 percent okay.

SPACECRAFT  Okay, copy.

SPACECRAFT  Okay.

CAPCOM  Challenger, Houston for Hoot.

SPACECRAFT  Go ahead, Jerry.

CAPCOM  Yeah, Hoot, we'd like reverification of the steps you went through on the MALF procedure.

SPACECRAFT  Okay, Jerry, I went through MALF 13.1 charlie.

CAPCOM  Challenger, Houston. We lost TDRS just as you gave us that information, Hoot. The thing we were questioning was, you read us 4781617, and not 9. We wanted to get a verification there.

SPACECRAFT  Okay. Let me open it up again and double check
that. And Jerry, if it's convenient with you, we'll get a control check here for the --

CAPCOM Okay Vance, we're ready for that.

CAPCOM Okay, Hoot, we're back with you. I saw you talking, but I couldn't hear you.

SPACECRAFT Okay, yeah, sorry about that. It was box 9 that I went to, not box 8.

CAPCOM Okay, copy. Thank you.

SPACECRAFT Okay, here comes a control check.

END OF TAPE
OK, this is Mission Control Houston. The EVA flight director, Dr. John Cox, and the EVA CAPCOM Jerry Ross are now in the mission control position at Mission Control. Airlock pressure is almost to 0.6.

Spacecraft: How do you read for airlock pressure in here? 0.6.
Spacecraft: I've got .5.
Spacecraft: Both checks complete, everything works.
CAPCOM: Look, it's going to go.
Spacecraft: Okay, Vance, thank you.
Spacecraft: I've got a bias in my airlock pressure sensor here, the high side.
PAO: This is Mission Control Houston, we show airlock pressure to be .2 psi presently.
Spacecraft: (garble) Okay, let's see. Did you close the airlock depress valve?
PAO: Data shows the hatch to be open.
Spacecraft: Depress valve is closed.
PAO: (garble) config...
Spacecraft: Thermal cover not yet open.
Spacecraft: H2 at (garble) PAM's snagged on your (garble)
CAPCOM: Houston, Challenger.

Go ahead.
Okay, yes, sorry about that, it was box 9 that I went to and not box 8.

Okay, copy, thank you.

Okay, here comes the control check.

This is Mission Control Houston, the EVA Flight Director, Dr. John Cox, and the EVA CAPCOM Jerry Ross are now in position at Mission Control. Airlock pressure is almost to zero and we may see the hatch open shortly.

How do you read for airlock pressure in here? 0.6.

I've got .5.

Both checks complete, everything worked.

Is that as low as it's going to go?

Okay, Vance, thank you.

I've got a bias in my airlock pressure sensor here, the high side.

(garble)

This is Mission Control Houston, we show airlock pressure to be .2 psi presently.

(garble)

Okay, let's see. Did you close the airlock depress valve?

Data shows the hatch to be open.

Depress valve is closed.

(garble) config...

Thermal cover not yet open.

(garble)

H2 at (garble) PAM's snagged on your (garble)

Houston, Challenger.

Go ahead.
Let's see if you can turn the water on.
Okay. (garble)
Houston, Challenger.
Go ahead Ron, we're back with you again.
Okay, Jerry, now that we're not going to bring the SPAS out, do we need to request any reconfiguration of the SPAS? We're on internal power right now.
Okay, we'll work in a note for you on that and for Vance, we see that you can go DAP rotation back to pulse.
Okay, DAP rotation back to pulse.
(garble), Bob.
It untangles the screw.
Challenger, Houston, we would like to have your waste dump heater to off now, please.
Okay, Jerry I'll go get that.
(garble)
Hey, Jerry. I'm up to open and stow the outer hatch. Is this is where we want a status report or wait until we get...
END OF TAPE
SPACECRAFT  Hey Jerry, I'm up to open and stow the outer hatch. Is this were they wanted a status report or wait 'til we get the hatch open?

SPACECRAFT  It can come now, I don't think it makes any difference.

SPACECRAFT  Houston, EV1.

CAPCOM  Go ahead Bruce, we'll take it now or wait 'til the hatch is open. Either one.

SPACECRAFT  That's okay, the hatch is coming open now.

SPACECRAFT  (garble) Monday.

SPACECRAFT  EV1, status report.

CAPCOM  Ready to copy.

SPACECRAFT  Time (garble), 13 minutes. Time left 7 hours, 10 minutes with 97% final read, 402% O2, suit pressure 4.3, oxygen 868, SLT pressure is 6210, (garble) pressure 2.9, FODC 19 (garble) 0, batt amps 3.3, RPM 2.1, 020.4, Orbiter temperature 69, Orbiter gas pressure 15.2, water pressure 14.9.

SPACECRAFT  Okay copy and, Bob.

SPACECRAFT  (garble) time EC is 15 minutes, time left 7 hours, 96% power, power 3% O2, 15.3, O2P is 876, alt pressure is 6360, (garble) t 3.0, battery volts 19, battery amps 3.4, RPM .0, CO2 0.3, R temp 64, gas pressure 14.9, water pressure 14.9. That's status.

SPACECRAFT  Okay, thanks.

SPACECRAFT  What do you want to know now?

SPACECRAFT  And it looks like another sunny day up here.

PAO  This is Bruce McCandless, the first out the hatch. And you see him fixing his tether.

SPACECRAFT  Your tether's wrapped around your (garble).

SPACECRAFT  You could be hooked to something else back in there, though. You're hooked on to the airlock wall panel.

SPACECRAFT  (Garble) flashlight.

SPACECRAFT  Flashlight. I'm going to go back and get it.
SPACECRAFT Amazing how these things can work their way into little loops.

SPACECRAFT Hang on a second, I haven't got ...

CAPCOM Challenger, Houston, who would like to an item 39 plus 4 on SPEC 221? That will cause the mass spec to swivel every 20 minutes. EV1 and 2, do you copy the mass spec will be cycling every 20 minutes?

END OF TAPE
CAPCOM  He would like to do an item 39 plus 4 on spec 221. That will cause the mass spec to swivel every 20 minutes. EV1 and 2, do you copy the mass spec will be cycling every 20 minutes?

SPACECRAFT  Yes, we can stay out of the way.

SPACECRAFT  Okay John, I understand you want item 39 plus 4. I see item 4 already listed in the item (garble) program 4 shown on spec 221 on item 39 at the present.

CAPCOM  Okay Ron, we want you to execute that again, please.

SPACECRAFT  Okay, will do.

SPACECRAFT  Copy.

SPACECRAFT  Bruce have you translating to the slide wires you have and free tether and going to the starboard MMU, and Bob translating to slide wire to the SESA and stow the flashlight.

SPACECRAFT  (garble), probably a result of operations (garble). Oh hey, can you guys see out the window? One of our operational slide wire brackets has come unpinned.

SPACECRAFT  It sure has.

SPACECRAFT  (garble)

SPACECRAFT  Is it on your side?

SPACECRAFT  Yes, look at this guys. (garble) Pick me up on (garble).

SPACECRAFT  Oaky, Bruce.

SPACECRAFT  Got it?

CAPCOM  Roger Bruce, we can see on the ground too, is the pip pin there?

SPACECRAFT  Pip pin is there and I will reinstall it but it's still a little startling.

CAPCOM  We agree with that.

PAO  This is Mission Control, Houston. McCandless is repairing the ...

SPACECRAFT  (garble) the prep, unstow the T-pad (garble).
SPACECRAFT Hello, Vance, we're taking a slight detour. I'm going to get Bruce the hammer.

SPACECRAFT Okay.

SPACECRAFT (garble).

PAO This is Mission Control, Houston. Now McCandless repairing the slide wire articulating arm. The slide wire itself is secure and not in any jeopardy. This ...

CAPCOM Houston for Bob.

SPACECRAFT Go ahead, Jerry.

CAPCOM Roger Bob, we think it'd probably be a good idea for you after you get Bruce configured with his T-pad to check all 4 corners on the slide wires and make sure those pip pins are secured.

SPACECRAFT Okay, I can do that.

PAO That Articulating Arm positions the slidewire and the slide wire is secure, not loose. And that doesn't translate into any safety problems for the EVA astronauts but as to why Bruce McCandless referred to it as startling was because that could have caused a problem with closing the payload bay doors. And the plan is now to check each of those arms to assure there rigidity and solidity.

SPACECRAFT The hammer the only thing you're going to need, Bruce?

SPACECRAFT Yes, I think so.

END OF TAPE
SPACECRAFT: I think it's down at the lower left part of the
(garble) Bob.

SPACECRAFT: Okay.

PAO: This picture is from delta camera, or this
picture is from bravo camera.

SPACECRAFT: (garble) to your waist tether here.

SPACECRAFT: (garble)

PAO: This picture's from the RMS elbow camera looking
forward to the crew preparing to reinstall the delta camera.

SPACECRAFT: This is nice not to be running so hard today. You
can see the world.

SPACECRAFT: Where are we now, Vance?

SPACECRAFT: Around the coast of Africa?

SPACECRAFT: Yes, that's affirmative Bob, just coming up on the
west coast. Coming up somewhere around the Congo basin I think.

SPACECRAFT: Could you give me yhe hammer on that wrist tether
on my wrist please.

PAO: Challenger just now overflying the west coast of
Africa, Angola, crossing the coast right now.

SPACECRAFT: Bruce, do you think you could get that on (garble)
mounted TV, in the position you're in now?

SPACECRAFT: Yes, did the middeck (garble) get locked up?

SPACECRAFT: Move this so I can see you.

SPACECRAFT: Yes, you're in (garble)

END OF TAPE
SPACECRAFT: Bruce, do you think you could get that on (garble) mounted TV in the position you're in now.

SPACECRAFT: Yes, did the middeck thing get hooked up?

SPACECRAFT: Move it so I can see you.

SPACECRAFT: Yes, you're in clear (garble)

SPACECRAFT: Okay, (garble) okay you should have it.

SPACECRAFT: Okay, we'll select it up and see what we have.

SPACECRAFT: All, all they need is the hammer in my hand here.

SPACECRAFT: Can you get it out?

SPACECRAFT: Yes, that's one of them (garble)

SPACECRAFT: Got it?

SPACECRAFT: Got one of them. Two of them, making progress (garble) now.

SPACECRAFT: That's hard work.

CAPCOM: Challenger, Houston for Bruce. Bruce, we'd like you to confirm that you've got that linkage reconnected on the slidewire.

SPACECRAFT: That's affirmative.

CAPCOM: Roger, thank you.

SPACECRAFT: Hey, Bruce, did you get that EV TV (garble) out?

SPACECRAFT: That's affirmative.

SPACECRAFT: Okay, we're not picking you up here, we'll continue to take a look at it.

SPACECRAFT: Bob, can you see if my green light is on.

SPACECRAFT: Turn this way a bit.

SPACECRAFT: Okay. Is my green light on?

SPACECRAFT: That's negative, it's not on.

SPACECRAFT: About now?

SPACECRAFT: No. (garble) no green light (garble), not
happening. No green lights.

SPACECRAFT But my finger is on the button?

SPACECRAFT Yes.

PAO Bruce McCandless trying to activate the TV camera, on his EVA.

SPACECRAFT You try pushing it once.

SPACECRAFT (garble) I can feel a bus clicking, no light.

SPACECRAFT Bruce and Bob.

SPACECRAFT Yes.

SPACECRAFT We're going normal jets, just to let you know. You're inside the bay so no problem.

SPACECRAFT Okay. Okay, looking over the T-pad, after we reconnected to primary last night, everything looks secure.

SPACECRAFT Houston, Challenger, we just had the manifold R5 jets take off again, you had said previously we can reset them (garble) and press on the verniers?

CAPCOM Negative, Hoot, we don't want you to do that, there is no power to those jets at this time. We would like you to go tail only, low Z.

SPACECRAFT Okay, we'll go tail only in low Z.

SPACECRAFT This is just one maintenance task after another here on EVA, really getting to see how you can fix things, you and Bob.

END OF TAPE
SPACECRAFT   Bruce, there's just one maintenance task after
another here on EVA, really getting to show how you can fix
things, you and Bob.

SPACECRAFT   Good.

SPACECRAFT   Yes, but.

SPACECRAFT   I'm working on the electrical connector now.

CAPCOM      And Challenger, Houston for Bruce. Bruce, you may
want to set your TV in one switch position and wait a couple of
minutes to see if the signal, I mean the battery conditioner
circuitry works. If it doesn't work in that position, cycle
(garble) and see if it works in that one.

SPACECRAFT   Okay, we had a green light on it last night when we
checked it, Jerry.

CAPCOM      Okay, copy that.

SPACECRAFT   Jerry (garble) the SPAS TV on by chance, I did try
to (garble).

CAPCOM      Okay Ron, I didn't copy all that, say again,
please.

SPACECRAFT   Saying that when I turned the SPAS TV on earlier,
my command to turn them off must have -- may have failed which
may block Bruce out.

SPACECRAFT   No, I'm not getting a green light here.

SPACECRAFT   Okay, camera delta is reinstalled.

CAPCOM      Okay, copy that. Bruce, EVA says that those
batteries may have changed state overnight so you may have to
repacify them.

SPACECRAFT   Okay. It came right up when I turned it on last
night. Okay camera delta should be back in operation, you can go
ahead and put the circuit breakers in give it a try.

SPACECRAFT   Bruce, your batteries are bad. Why don't you take
your switch off.

SPACECRAFT   Hey Ron, I can't tell whether my switch is on or
off. I just have to leave it in one position for awhile. just
like a push button. Camera delta is back installed. I'd like
you to close the circuit breakers in it and see if it works.

SPACECRAFT   Okay, we'll try it.
SPACECRAFT  Okay Bruce, we don't have any video yet on camera delta. Not yet, Bruce.

CAPCOM  Challenger, Houston for Vance or Hoot.

SPACECRAFT  Hi Jerry.

CAPCOM  Roger Vance, we'd like you to go to FS10-1, that's the aft flight station configuration sheet and configure for loss of verniers.

SPACECRAFT  Okay, 10-1,FS.

CAPCOM  Roger that and you've got 8000 lbs of prop so we don't have to worry about using norm Z or low Z's rather. We're 48 seconds to LOS here, Yarragadee next at 22:12. We'll probably only be able to hear you there. Hawaii at 22:37, configure Ku to stand by, please.

PAO  This is Mission Control, Houston. We're LOS through the TDRS system. We've had a failure with vernier jets on the vehicle which has caused the Mission Control Team to advise to select aft vernier jets for attitude control. We'll have acquisition again in 8 minutes. Voice only through the UHF station at Yarragadee, at mission elapsed time, 5 days, 22 hours and 4 minutes. The delta camera has been reinstalled but initial checks showed no joy in getting an image from it. The next item on the checklist will be preparation and checkout of the starboard MMU, our Man Maneuvering Unit, to check its condition to verify its battery level and then prepare it for the day's test objective. AOS in 7 and 1/2 minutes at MET, 5 days, 22 hours, 4 minutes, this is Mission Control, Houston.

END OF TAPE
Okay, Bruce, it's pretty well (garble) out there and we're way behind on the timeline, and (garble).

No, we don't have that dump going, Dob. I think that's just some residual.

Okay. Okay, copy. (Garble) Bruce, and I guess you got your--- and your sublim. er working okay. Is that right?

(Garble) what, a drying out (garble)?

This is Mission Control, Houston. We're about a minute away from acquisition through Hawaii. According to the timeline, Bruce McCandless should be preparing the starboard MMU, donning and checking out that instrument while Bob Stewart is preparing and unstowing the trunnions and attachment device, which, subsequently, would be installed upon the McCandless MMU, and we'll have voice verification through Hawaii to see how they're progressing relative to the timelined activities. We're less than a minute away from acquisition at 5 days, 22 hr, 37 min, Mission Control, Houston.

That's affirm, Bruce, they're both out now.

I thought I saw the pressure gauge lights go off.

Challenger, Houston. Hawaii for 8 min.

Roger Houston. A little summary. We have operation of camera D now. Of course, it still has the same problem in trunnion, but we have a good picture, and we can move it back and forth. The repair was accomplished inserting the pip pin on the slidewire bracket. Bruce is on the starboard MMU checking it out. Pressure on each side is 2600 psi. Each --- Bob progressed down to the end of the arm to the end effector, did that task, he'll report to you on it, and, finally, both crewmen have had a sublimater press message. They were able to restart and each has sublimater pressure now of 2.6.

Okay, Vance. We copy all that. Thank you.

This is Mission Control, Houston. There'll be no TV through Hawaii, but we will get images when we acquire TDRS.

(Garble) on the outside drivers. Did you ever see the power come back, and second, do you want us to take the driver switch off. We left it on.

Roger, Hoot. We'd like to leave the driver switch on and the power is still off.

Okay. Copy. Thank you.
SPACECRAFT  You bet.

PAO    Mission Control, Houston, we have cancelled the 12:30 a.m. Change of Shift press conference with off-going Flight Director, Larry Bourgeois. Mission elapsed time, 6 days, 17 hours.

CAPCOM  Challenger, Houston, we're 10 minutes to LOS TDRS. Looks like the temps for the dump won't get up until LOS. I've got a two-step procedure for you whenever you're ready to copy.

SPACECRAFT  Okay, I'll take that.

CAPCOM  Okay, after you get the FTA there at 300 degrees, we'd like you to take the supply water tank bravo inlet valve to close and then dump tank bravo to 20%. Of course, you'll have to use the dump isol valve for that.

SPACECRAFT  Okay, Guy, copy. We're going to get to 300 degrees, get the FTA, take the tank inlet valve closed and then dump tank bravo to 20% using, of course, the isol valve.

CAPCOM  Roger and we'll open up a tank B inlet valve once we get tanks charlie and delta topped off.

SPACECRAFT  Okay, copy.

PAO    Mission Control, Houston. Thus far in the crew's morning, they have done an IMU alignment, cooked a little breakfast, or are in the process of cooking some breakfast and they're working with dumping waste water tank B, bravo, and they'll wait until the temperature on that sensor aboard gets to 300 degrees in a solar bake and then they'll go ahead and try to dump it. Mission elapsed time, 6 days, 17 hours, 10 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston, we're 2 minutes 'til LOS TDRS, see you at Yarragadee at 28.

PAO    Mission Control, Houston. Today's activities aboard the Challenger primarily concerned with cabin stowage, preparation for entry early Saturday. There will be a press conference with the crew at approximately 5:51 a.m. this morning. And if all goes as planned on today's updated CAP, we should see a KSC landing tomorrow, if we do get the nominal landing, at right now 7 days, 23 hours, 19 minutes and 4 seconds. At mission elapsed time, 6 days, 17 hours, 20 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston's with you through Yarragadee at 7 minutes.
SPACECRAFT  (garble) Yarragadee.

SPACECRAFT  And John, we'd really like to thank you and congratulate you on sending up that music from the Air Force Choir.

CAPCOM  Roger that.

SPACECRAFT  Hey, John, I seem to remember some different words to it back in the 40's. Do you know anything about that change?

CAPCOM  Well, we made a change back late in the 40's.

SPACECRAFT  I thought the song originally said nothing could stop the Army Air Corps and then we find out (garble).

PAO  Mission Control, Houston. The Flight Director of this shift is Entry Flight Director Gary Coen. Although the team in here is orbit 1, it's a common practice the day before entry, for the Entry Flight Director to come in and get familiar with the vehicle and spend some time on console before coming back to direct a landing. At mission elapsed time, 6 days, 17 hours, 34 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston, we're going LOS Orroral in about 1 minute. I have one note for you and that is that we see a --

END OF TAPE
CAPCOM Challenger, Houston, we're going LOS Orroral in about 1 minute. I have one note for you and that is that we see a .6 delta P between the cabin and the airlock and we'd like to equalize that. So on the airlock hatch, if you could check both equalization valves to normal.

SPACECRAFT Okay John, I'll take care of that. I'm going to open the airlock up in just a second anyway and terminate the EMU battery recharge.

CAPCOM Okay, thanks a lot, Bruce, and we'll see ya'll next, TDRS, 17 plus 59.

SPACECRAFT Okay John, we'll see you on TDRS.

CAPCOM Challenger, Houston is with you through TDRS.

SPACECRAFT Go ahead, Houston.

CAPCOM Roger, and I have a flight note for either Hoot or Vance.

SPACECRAFT Okay, go ahead, John.

CAPCOM Roger, Hoot, this morning we are -- for the flight control system checkout, we're going to be using APU #1 and instead of doing what we thought we were going to do earlier this morning, we are not going to use APU fuel pump valve cool A auto. We are only going to perform the task with B auto. And we would like you to go ahead and move the APU steam vent heater activate up forward in the CAP and start that at 18 plus 10.

SPACECRAFT Okay, copy John, we'll do the steam vent heater activation 5 minutes from now.

CAPCOM That's affirmative, and then later when you do get to the flight control system checkout, APU 1.

SPACECRAFT Okay, copy, APU 1 and we will not use the A coolant on the pump valve cool.

CAPCOM Roger, that's a good read back.

CAPCOM Challenger, Houston, Guidance is providing you with a new state vector and I have a note of reference in attitude maneuver in about an hour when somebody's ready to copy.

SPACECRAFT Stand by one, John, we'll be with you in a moment.

CAPCOM Roger that, standing by.
CAPCOM: Okay, John, I understand you got a note on an attitude maneuver.

CAPCOM: Roger, Hoot. The change is at 19 plus 35 there in the CAP. To improve our Ku-band coverage for the flight control system checkout, we'd like to change the omicron to 0 instead of 180.

SPACECRAFT: Okay, we copy that, John. We'll do that, we'll make omicron 0 when we do the maneuver at 19:35 instead of 180.

CAPCOM:Roger that.

SPACECRAFT: And John, do you know if the debriefing that the guys did on ICOM bravo got down okay last night?

CAPCOM: We'll check on that for you, Hooter.

SPACECRAFT: Okay, thanks John.

CAPCOM: Challenger, Houston. Hoot, to answer your question, we have it on the ground. We are reproducing it but we haven't listened to it yet.

SPACECRAFT: Okay, thank you, copy.

CAPCOM: Roger that.

CAPCOM: Challenger, Houston, I have your on-orbit RCS burn data for your OMS RCS interconnect test.

END OF TAPE
CAPCOM     Challenger, Houston, I have your on-orbit RCS burn data for your OMS RCS interconnect test.

SPACECRAFT  Okay, stand by just one second, John.

CAPCOM     Roger that, I'll stand by.

SPACECRAFT  Okay, we're ready to copy, John.

CAPCOM     Okay, it'll be right OMS to RCS, multi-axis, RCS select, TV roll 180, weight 212327, TIG 006/19:30:00.0, PEG 7, all balls -038.0, all balls, burn at 241.4, 284.9, 358.8, delta V total 0038.0, TIGO 00:34, Vgo ax -0001.72, all balls, +037.96, target HAL58 by +146, readback.

SPACECRAFT  Okay, John. We've got right OMS shield connected to RCS, TV roll of 180, it'll be a RCS burn, of course. The weight 212327, TIG time is 006/19:30:00.0, delta V, all balls, -038.0, all balls, burn attitude 241.4, 284.9, 358.3, delta V total 0038.0, TIGO 00.34, Vgo ax -0001.72, all balls, +037.96 and it's a 158 by 146.

CAPCOM     Roger, that's a good readback except for one item. The burn at, the yaw is 358.8.

SPACECRAFT  Okay, if I didn't read that back, that's what I meant to read back, that's what I have written down, 358.8 on the yaw for burn attitude.

CAPCOM     Roger and that's a good readback and just a reminder to use message 69 bravo with your OMS RCS interconnect test.

SPACECRAFT  Okay, we'll do, thanks, John. We've got that written into the orbit ops book.

CAPCOM     Roger that.

CAPCOM     Challenger, Houston. The targets are onboard for the burn.

SPACECRAFT  Great, thank you, John.

CAPCOM     Houston 9, NASA 901, I'm 2597, how do you read me? Houston. Houston 901, I'm -- Houston 9, NASA 901, 2597 radio check. And Houston NASA 901 coming to you on 2597, how do you read? Okay, thank you, sir. Okay Houston 901, we read you loud and clear this time. Sounds good. That's a big 10-4.

CAPCOM     Challenger, Houston, we see the supply dump nozzle temp approaching 300 degrees. While we have coverage with you,
we'd like you to go ahead and proceed with the steps we gave you earlier.

SPACECRAFT  Okay, John, we'll do it.
CAPCOM      Roger, thanks a lot.
SPACECRAFT  John, so far that dump doesn't appear to be working.
CAPCOM      Challenger, we agree. We don't think it's working either.

END OF TAPE
SPACECRAFT John, so far that dump doesn't appear to be working.

CAPCOM Challenger, Houston, we agree. We don't think it's working either.

CAPCOM Challenger, Houston, we'd like you to go ahead and close the dump isol, close the dump valve and turn the heater off.

SPACECRAFT Okay John, close the dump isol and this time we want to close the dump valve in addition and turn the heater off.

CAPCOM That's affirmative.

SPACECRAFT Okay, that's done.

PAO This is Mission Control, Houston, still unable to dump water from the supply tank bravo, presumably because of a plug of ice between the dump valve and nozzle. All sorts of thermal measures taken to try to remove or reduce that plug of ice and none successfully. Mission elapsed time is 6 days, 18 hours, 47 minutes and they have another 5 and 1/2 minutes remaining in this TDRS pass, this is Mission Control, Houston.

CAPCOM Roger, go ahead.

SPACECRAFT Hey John, the HRM deactivated at 18:47.

CAPCOM Thank you very much, Bob.

CAPCOM Challenger, Houston, we're going LOS TDRS in a minute and a half. See you at Yarragadee at 19 plus 0'.

CAPCOM Challenger, Houston's with you at Yarragadee for 7 and 1/2 minutes.

SPACECRAFT Roger, you (garble) loud and clear (garble).

CAPCOM Roger, and you're loud and clear also.

PAO This is Mission Control, Houston. Signals transmittal will improve markedly over Yarragadee. That initial contact was with the Orbiter just under 3 degrees elevation over the horizon and maximum elevation during this Yarragadee pass will be at 80 degrees. So the Challenger will pass almost directly overhead at the Yarragadee station.

CAPCOM Challenger, Houston. We just shipped a weather teleprinter message up to you. We'll go LOS Orroral at 19 -- in 30 seconds. See you TDRS at 19 plus 36.
SPACECRAFT: Okay Houston.

PAO: This is Mission Control, Houston at 6 days, 19 hours, 16 minutes mission elapsed time. While we were AOS over Orroral, we were able to see that the Challenger had maneuvered to a burn attitude in order to effect the reaction control system development test objective with a firing due to occur at -- in 12 and 1/2 minutes at mission elapsed time 6 days, 19 hours, 30 minutes. Challenger on its 109th orbit of the earth on the ascending node. We will reacquire voice through the TDRS system in 19 minutes, so this RCS burn will occur in the blind. We'll stand by to read the effects of that burn when we come AOS. At 6 days, 19 hours, 17 minutes, this is Mission Control, Houston.

PAO: This is Mission Control, Houston, we'll be AOS just a moment or two with voice through TDRS. And learn of the results of that RCS burn. It's mission elapsed time, 6 days, 19 hours, 37 minutes, this is Mission Control, Houston. Data indicates the test looked good.

CAPCOM: Challenger, Houston is with you through TDRS. We would like to see you go ahead and terminate the interconnect --

END OF TAPE
PAO        Data indicates tests look good.

CAPCOM    Challenger, Houston is with you through TDRS. We would like to see you go ahead and terminate the interconnect and go straight feed.

SPACECRAFT Okay, that was going to be the question I had for you, John. So, we'll go ahead and do that.

CAPCOM    Roger that.

SPACECRAFT And John, understand this was an OMS feed DTO so we didn't really trim all the residuals down to 0 because I reached the fuel that I was supposed to go to through the interconnect. Actually I went a bit over it, I got the 5.0 instead of the 4.6. And so we did not trim out all of the residuals.

CAPCOM    We copy that, Hoot, and it sounds real good to us. We're happy with that.

CAPCOM    Challenger, Houston, you can go ahead with the maneuver now if you want.

CAPCOM    And Challenger, Houston, we're standing by for the FCS checkout when ya'll get on to it.

SPACECRAFT Okay, we're starting on it. We're getting the switches set up right now.

CAPCOM    Challenger, Houston, we're handing over to MILA to get high data rate.

SPACECRAFT Roger.

PAO        This is Mission Control, Houston. The crew is a little bit behind the timeline, we're standing by to watch checkout of the flight control system, the procedure usually done the day before entry to make sure all the flight control services and APU systems are operating adequately. And we're watching data now to see when the crew fires up auxiliary power units which should be forthcoming. Mission elapsed time is 6 days, 19 hours, 47 minutes, this is Mission Control, Houston.

CAPCOM    ... with good high data rate data.

SPACECRAFT Roger, we're in the middle of the G2 to 8 transition.

CAPCOM    Roger that.

SPACECRAFT Houston, Challenger.
CAPCOM     Roger, go ahead Vance.

SPACECRAFT     Okay for part 1 of the FCS checkout, we're in DAP A6, is that good?

CAPCOM     Stand by 1, Vance. I'll try to get you an answer, we've been discussing that.

CAPCOM     Challenger, Houston, Flight has decided that we have the consumables, you can go ahead and press ahead.

SPACECRAFT     Okay and we just got a poll fail on CRT2 that we're looking at.

CAPCOM     Roger, we see that and are looking at it, also.

SPACECRAFT     John, I had noticed on CRT2 too, about half an hour or 40 minutes ago, that the DEU flag was tripped on it and one reset and that could account for it, like we were briefed on preflight, which was a DU.

CAPCOM     Roger, copy, Hoot, thanks a lot.

SPACECRAFT     Okay, we regained it by cycling power and reassigning.

CAPCOM     Roger, that's good news. Challenger, Houston, you're go to proceed with the FCS checkout.

SPACECRAFT     Roger.

PAO     Data indicates also that Mission Specialist Bruce McCandless is in the middeck powering off batteries for the EMUs and is in the post-EVA entry preparation portion of his activity plan.

SPACECRAFT     Houston, Challenger.

CAPCOM     Roger, go.

SPACECRAFT     John, on step 2 where it has me verify no under APU hydraulics and water flow it says (garble) your down errors. I don't have any up errors or down errors, but I've got a bunch of lower limits, are those okay?

CAPCOM     Roger, they are okay.

SPACECRAFT     Okay.

CAPCOM     Challenger, Houston, if you're ready for the APU start, you have a go from us whenever you are ready. END OF TAPE
CAPCOM Challenger, Houston, if you're ready for the APU start, you have a go from us whenever you are ready.

SPACECRAFT Okay, Houston, how much time do we have before LOS?
CAPCOM Roger, we have about 2 and a half minutes.
SPACECRAFT Okay, and then when's the next AOS?
CAPCOM Roger, the next one's at Dakar in about 7, but Flight would like you just to go ahead and we'll get any of the other data we need on the dump.
SPACECRAFT Okay, we were reading ahead a little bit but we'll just jump right into it then.
CAPCOM Roger, that.
SPACECRAFT Okay, we're starting up.
CAPCOM Roger.

PAO This is Mission Control Houston, we see APU number 1 running. RMU systems officer verifies that the data on APU number 1 looks good.

SPACECRAFT Houston, did you see that?
CAPCOM I'm not sure we did, Vance, if you could report what you saw, we have low data rate.

SPACECRAFT Okay, we're going to APU shutdown.
SPACECRAFT Yes, John, it all looks fine and we're on step 6 now.
CAPCOM Roger that, we captured...
SPACECRAFT Houston, are we go for APU shutdown?
CAPCOM Roger, you're go for APU shutdown, and GNC saw the data.
SPACECRAFT Good.

PAO This is Mission Control, Houston. The data showed good speeds, good pressures, good temperatures out of the APU test. Mission Elapsed Time is 6 days 20 hours 4 minutes.

CAPCOM Challenger, Houston, we're going LOS TDRS here in a couple of minutes, we may drop out. See you Yarragadee at 20 plus 38.
SPACECRAFT    Okay, Houston, and we're on, finishing up on page 7-19 and no anomalies yet.

CAPCOM      Roger, that, that sounds great, Vance. Challenger, Houston, GNC says it looks good to us so far.

SPACECRAFT    Great, that's the way we all like it.

CAPCOM      Roger, that.

PAO         This is Mission Control, Houston. 6 days 20 hours 27 minutes, Mission Elapsed Time. The flight crew and Mission Control team exchanging affirmation that the flight control system checkout is going to satisfaction, along with participants. We'll acquire signal through Yarragadee in 10 minutes, this is Mission Control Houston.

CAPCOM      Challenger, Houston is with you through Yarragadee for 7 and a half minutes.

SPACECRAFT    Roger, Houston. And we're on SPEC 42 right now.

CAPCOM      Challenger, Houston, we're going LOS Yarragadee in 30 seconds, we'll see you at Hawaii at 21 plus 04 enjoy...

END OF TAPE
ST5-41-B AIR/GROUND TRANSCRIPT t/06j 041;09:39 2/10/84 PAGE 1

SPACECRAFT And we're on SPEC 42 right now.

CAPCOM Challenger, Houston. We're going LOS Yarragadee in 30 seconds, we'll see you at Hawaii at 21 plus 04. Enjoy your pass over Australia.

SPACECRAFT Okay, John.

PAO This is Mission Control, Houston, at 6 days 21 hours 4 minutes, standing by for voice through Hawaii.

CAPCOM Challenger, Houston is with you at Hawaii for 6 and a half minutes.

SPACECRAFT Okay, Houston, very timely. It's time to start the RCS hot fire test, we're on page 10-2, we're all set up and just about ready to begin our first pulse THC plus X.

CAPCOM Roger, we copy that, Vance.

SPACECRAFT And if you have data, we'll proceed.

CAPCOM Roger, if you could hold one -- just a second, Vance, we'll give you a call.

PAO This is Mission Control, Houston. This hot fire test is a firing sequence of the reaction control system jets. Again, a part of the flight control checkout process.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead and we are go for the hot fire test.

SPACECRAFT Okay, and we need to find out, let's see, we are A3 for the hot fire test on DAP, just verify that's the correct DAP.

CAPCOM Roger, that's a good DAP, Vance.

SPACECRAFT Okay.

PAO DAP is the digital auto pilot, he was just verifying the proper program for that instrument.

CAPCOM Challenger, Houston, the target state vector has been updated in preparation for the rendezvous nav.

SPACECRAFT Copy.

CAPCOM Challenger, Houston, we're going LOS Hawaii 30 seconds, we'll see you up TDRS in a couple of minutes.
CAPCOM And PROP said that -- he appreciates that Vance.

PAO This is Mission Control. It's about a half a minute before we reacquire, a minute and a half rather, before we reacquire through TDRS.

CAPCOM Challenger, Houston. We're back with you TDRS and PROP is looking at his data.

SPACECRAFT Okay, Houston. Okay, Houston, you got us now still?

CAPCOM Roger, and we have good data, Vance, ready to watch your test.

SPACECRAFT Okay, we'll start with the plus X on the middle of page 10-3.

CAPCOM Roger, that.

SPACECRAFT John, we completed the hot fire, how did it look?

CAPCOM Roger, it looked real good to us, Vance, thanks a lot.

SPACECRAFT It looked good to us. We, we've seen no anomalies. We did have just one nit to mention in the prior check which we'll give you in a minute.

CAPCOM Roger, understand.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Yes, John, we have -- out of the controller checkout, we have a real nit for you but during the high test on the dedicated controllers, commanders (garble) nautical miles still. We are at 305,000 and the pilots read 307,000 instead of 300,000. Like I say, it's kind of a nit.

CAPCOM Roger, understand.

PAO This is Mission Control, Houston. That discrepancy that Challenger Pilot Hoot Gibson reported is identical to one which made itself apparent during STS-8, with the same vehicle. That bias is not a hard bias, it remains constant all the way down, it reduces proportionally to level, that is, they consider it insignificant at lower levels.
PAO Made itself apparent during STS-8 with the same vehicle. That bias is not a hard bias, it remains constant all the way down, it reduces proportionally to level, that is they consider it insignificant at lower levels. It's Mission Elapsed Time, 6 days 21 hours, 24 minutes, and the flight control system checkout is just about complete.

CAPCOM Challenger, Houston, to get back to you on your nit on the flight control system check. We concur it is a nit, on flight 8, we saw the same phenomenon and our experience showed that it wasn't a factor and all as we got down to lower altitudes.

SPACECRAFT We agree, I think it's rather fantastically great to go through a test, two tests like that and that's the only thing we can find wrong.

CAPCOM Roger, that, Vance.

SPACECRAFT Vance figured we had to tell you something, or else you'd think we didn't really...

CAPCOM Understand, Hooter. Challenger, Houston, I have a couple of questions for you if this is a good time for you.

SPACECRAFT Sure, go ahead.

CAPCOM Roger, Vance. First of all, when you got the CRT 2 BITE, did that occur in conjunction with a major function switch?

SPACECRAFT Yes, I'll let Hoot explain it, because he was moving the switch at the time.

SPACECRAFT Yes, John, (garble) earlier today, I wrote a note on my kneeboard that the DEU find was tripped on CRT 2 and then I thought that I saw one little flicker out of him later on, but what caused the guy to go poll fail was switching from GNC to SM.

CAPCOM Roger, I owe Flight a coke.

SPACECRAFT You want me, you want me to report something different?

CAPCOM And Hoot...

SPACECRAFT Houston.

CAPCOM Go ahead.

SPACECRAFT Go ahead.
CAPCOM      Roger, DPS says that that's just a timing problem and our experience has shown that means the CRT will be okay, you can expect it to be okay. Challenger, Houston, did you copy what I told you DPS felt about that CRT 2 BITE?

SPACECRAFT We heard you say that it was just a timing problem, then you dropped out.

CAPCOM      Roger, Vance, it was just a timing problem, we have had experience with that before, we believe that your CRT number 2 will be -- will work just fine.

SPACECRAFT That's great and let's see John, you'd like to see us sit in this attitude even though we're done a little early till 21:45, is that right, in this inertial attitude?

CAPCOM      Stand by, Vance, I'll get you an answer, we've been talking about that here the last five minutes. Challenger, Houston, we want to stay in this attitude and we would like you to stay in it until we tell you to initiate track to the next maneuver because we need to update the target TDRS state.

SPACECRAFT Okay, we'll stay at this inertial attitude.

CAPCOM      Roger, that. And if somebody is back near the RMS panel, I have a switch back there I'd like them to look at.

SPACECRAFT Go ahead.

CAPCOM      Roger, confirm...

SPACECRAFT Go ahead, John.

CAPCOM      Confirm that the RMS break switch is in the on position.

SPACECRAFT Okay, break switch was in the off not in the on position.

CAPCOM      Understand it was in the on position.

SPACECRAFT Negative, the break was in the off position. Just switched it to the on position.

CAPCOM      Understand and you switched it to the on position, thank you.

SPACECRAFT That's affirm.

CAPCOM      Challenger, Houston, while I'm talking to you, we had two switches that EECOM is interested in. We see your cabin
pressure down at about 14 so if somebody's down by panel M032 mike, I have a switch they can check.

SPACECRAFT  Stand by 1 John.
CAPCOM       Roger, that.

END OF TAPE
CAPCOM: -- 14, so if somebody's down by panel MO32 mike, I have a switch they can check.

SPACECRAFT: Standby one, John.

CAPCOM: Roger that.

SPACECRAFT: Okay, go ahead.

CAPCOM: Roger, Vance, if you could take the LEH 02 valve number 5 and put it to open.

SPACECRAFT: Okay, that's done.

CAPCOM: Roger, and one more from him, up on L1, in order to help boil some of the water off, if you could take the rad controller out temperature to high.

SPACECRAFT: It's in high.

CAPCOM: Thanks a lot.

CAPCOM: Challenger, Houston. Hate to bother you again, but evidently when you loaded your TFL 161, it didn't take, so if you would reload that again for us, we would appreciate it. That is TFL 161.

SPACECRAFT: Okay. I'll give you a 161 over again, John.

CAPCOM: Thanks a lot.

SPACECRAFT: And we, yeah, we have it showing on SPEC 62, John, but I'll go ahead and do another one.

CAPCOM: Roger. We understand. Our data shows that you did it, but for whatever reason, it didn't get latched, so if you could do it again, we would appreciate it.

CAPCOM: And Challenger, Houston. Sorry to bother you again, but we have a new TDRS target state vector onboard now, so you are go to initiate the maneuver on time per the CAP.

SPACECRAFT: Copy. Initiate the maneuver at 45 past the hour.

CAPCOM: Roger that.

SPACECRAFT: Okay, John, you should have the new reloaded format 161 now.

CAPCOM: Understand. I'll let you know if it's working. And Hoot, the 161 format is now downlisting. Thanks a lot.
Okay.

Challenger, Houston. A question for Bruce, if he has a minute.

Houston, Challenger. Do you read?

Roger, Bruce. Loud and clear. How us?

You had a question?

Yes, if you have a minute, Bruce, we would like to know, have you been able to close and engage the door latches on MD23R?

Affirmative. Here on middeck 23 Romeo is secured for entry.

Thanks a lot, Bruce.

(Garble)

Houston, Challenger.

Roger. Go ahead.

John, do you know if there's supposed to be any volcanic activity just to the north of our ground track at about our present position?

I'll check on that for you, and get back to you.

Okay. It may not be, but the reason I'm asking is that looking up a ways to the north, there's an island that there's a smoke cloud rising off of it, and it doesn't appear to be just an atmospheric cloud formation. It kind of looks like it's rising up off the island.

Roger. Copy that. I'll get back to you. We'll check with weather.

I should add, it's far enough away that I can't be really sure.

Roger.

Challenger, Houston. I have a little CAP adjustment for you after the press conference when you're ready to copy.

Okay, John, ready to copy.
CAPCOM  Roger. After the press conference is completed, and before the TV --

END OF TAPE
CAPCOM ...press conference when you're ready to copy.

SPACECRAFT Okay, John, ready to copy.

CAPCOM Roger, after the press conference is completed and before the TV is deactivated, we would like you to perform the PDRS ops checklist under the SPAS, step 2 on pages FS 3-3 and 3-4. Then we would like to see live TV of the SPAS disconnect using the best camera that you think you need to do that to view the umbilical mechanism. Finally when you are complete with that, you can deactivate the TV per the CAP and then maneuver as soon as possible to minus ZLV.

SPACECRAFT Okay, John, we've got, after the press conference but before we've deactivated the TV, go to the PDRS checklist and the under the SPAS section, perform FS 3-3 and 3-4, set it up for live TV on the umbilical disconnect and when we're complete, deactivate the TV and go back to minus ZLV HF.

CAPCOM Roger, that, good readback.

CAPCOM Challenger...

PAO Challenger, this is Houston PAO, how do you copy?

SPACECRAFT Hello, Houston PAO, we get you loud and clear.

PAO Challenger, this is Houston PAO, how do you copy?

SPACECRAFT Houston PAO, Challenger, we got you loud and clear.

PAO Fine, thank you very much.

SPACECRAFT Houston, (garble) PAO check was (garble)

CAPCOM Challenger, Houston calling. Just for your information, the voice check with PAO was good both ways.

SPACECRAFT Okay, John, and we still have to check out our microphone system in that total link but we'll have that stuff pretty quick, and we'll probably call you for it just to check to the CAPCOM and the MOCR when we get that done.

CAPCOM Roger, that, Vance.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT John, prior to separating the SPAS umbilical, do we need to do any sort of SPAS powerup for that?
CAPCOM        Negative, you do not and, Hoot, PAYLOADS just
wanted me to confirm that you are only going to do step 2 and not
step 3 on that procedure.

SPACECRAFT    Hey, that would be a real good idea, wouldn't it.

CAPCOM        Roger, that.

PAO           This is Mission Control Houston, step 3 would have
been deploy. Mission Elapsed Time is 6 days 21 hours 54 minutes.

END OF TAPE
STS-41-B AIR/GROUND TRANSCRIPT t410j 041:10:53 2/10/84 PAGE 1

SPACECRAFT  Hey, that'd be a real good idea, wouldn't it?
CAPCOM  Roger that.
PAO  This is Mission Control, Houston. Step 3 would have been deploy. Mission Elapsed Time is 6 days, 21 hr, 54 min.
CAPCOM  Challenger, Houston. We're going LOS TDRS in a minute. We'll see you at Yarragadee at 22 plus 14.
SPACECRAFT  Okay, John, 22 plus 14.
CAPCOM  Roger that.
PAO  Yarragadee, this is Houston PAO. How do you copy?
       Loud and clear. Yarragadee has you loud and clear.
PAO  We copy you loud and clear also, Yarragadee.

946 LACD
946. Go ahead.

Okay, if you can go ahead and bring up 2 50 97, Joe's ready to try a comm check with you.

Okay. Tell him to proceed.

Okay 946, Houston CAPCOM. How do you read?

946, Houston CAPCOM.

946, Houston weather. How do you read?

Houston weather, NASA 94 (garble)

Don, I read you too. Do you hear a squeal in my background?

Yes, I do hear a squeal.

Okiedokes. We've been listening to your weather reports, so this comm loop is the one we wanted to verify, and I guess we need to chase down this squeal.

CAPCOM  Challenger, Houston is with you at Yarragadee for 6-1/2 min.
CAPCOM Challenger, Houston. We show tanks charlie and delta are just about filled. We'd like to go ahead and open tank bravo's inlet.

SPACECRAFT Okay. Open tank bravo's inlet.

CAPCOM Roger.

SPACECRAFT Houston, Challenger. Over.

CAPCOM Roger. Go ahead, Bruce.

SPACECRAFT Roger, John. We're taking down the teleprinter setup for the press conference.

CAPCOM Understand.

SPACECRAFT Houston, Challenger on the handheld mike. Do you read?

CAPCOM Roger. We read you loud and clear.

SPACECRAFT Roger, John, how about giving us the (garble) for a long count, please

CAPCOM Okay.

SPACECRAFT How about giving us a long count, please.

CAPCOM Roger. Testing 1 2 3 4 5. Over.

SPACECRAFT Alright, Hoot.

CAPCOM Challenger, Houston. We're going LOS Yarragadiee in 30 sec. See you at Hawaii at 22 plus 39.

SPACECRAFT Okay, John.

PAO Mission Control, Houston at 6 days, 22 hr, 22 min Mission Elapsed Time. We'll acquire through Hawaii in 17 min. The crew is obviously configuring the vehicle for the press conference scheduled to occur at 5:51 a.m., Central Time, and that's just about 30 min from now, at the time that occurs with acquisition through the TURS systems, so we'll have downlink video of the crew in the middeck for that press conference. This is Mission Control, Houston.

PAO This is Mission Control, Houston. We'll have voice through Hawaii in a few moments at 6 days, 22 hr, 39 min Mission Elapsed Time.
CAPCOM

Challenger, Houston is with you at Hawaii for 7 min.

END OF TAPE
PAO Mission Control Houston, we'll have voice through Hawaii in a few moments at 6 days 22 hours 39 minutes, Mission Elapsed Time.

CAPCOM Challenger, Houston, is with you at Hawaii for 7 minutes.

SPACECRAFT Hi, Houston, we're with you, how do you hear?

CAPCOM Roger, loud and clear and if somebody has a second, we'd like to have you go ahead and put the test pattern on the downlink and then enable the TV downlink just so we can check it out. Challenger, Houston, that configuration looks good, we will check the TV at TDRS.

SPACECRAFT Sounds good, John.

CAPCOM Challenger, Houston, we're one minute to LOS Hawaii, we'll see you up TDRS in a couple of minutes.

SPACECRAFT Okay, John, and we're all set up here to talk with you.

CAPCOM Roger, that and I'll give you the normal AOS call there and then a few minutes later when we know we have good high data rate, I'll give you a call and tell you that.

SPACECRAFT Okay.

PAO This is Mission Control, Houston. It's 6 days 22 hours 47 minutes, Mission Elapsed Time, and less than a minute away acquisition of signal through TDRS and as soon as we get high data rat, good lock up on the video, we will initiate the press conference from the news center at building 2 at Johnson Space Center.

Testing 1, 2, 3, testing 1, 2, 3, do you copy?

PAO This is Mission Control, Houston. We're still waiting for a good lock on the TDRS.

CAPCOM Challenger, Houston, radio check.

SPACECRAFT Roger, Houston, we have you loud and clear.

CAPCOM Roger, we'd like you to take your S-band TM antenna switch and select lower right forward please.

SPACECRAFT Lower, right forward. Bruce is getting that.

PAO This is Mission Control, that action to improve signal strength.
SPACECRAFT    It's on.
CAPCOM        Roger, thank you.
PAO           INCO reports good lock on the signal.
CAPCOM        Challenger, Houston with you through TDRS, I'll give you a call when we're with high data.
SPACECRAFT    Roger John.
PAO           We're switching to high data rate to accommodate the color video signal.
CAPCOM        Challenger, Houston, the press is on the line.
PAO           Good morning Commander Brand.
SPACECRAFT    Okay, very good, we're here.
PAO           Good morning Commander Brand and crew aboard the Challenger, we're ready for the on-orbit news conference. For the press, please wait for the mike and please give your name and affiliation if I don't identify you. Paul Recer, Associated Press.
RECER         To Bruce McCandless and Bob Stewart, as operators of the MMU...
SPACECRAFT    Okay, just a minute, first let's get the crew in here, come on in. Okay, we're all here.
RECER         To Bruce McCandless and Bob Stewart. As operators of the MMU, you saw and felt things never before experienced, you've given your report as pilots and as astronauts, can you tell us please in more human and perhaps even poetic terms what you saw and felt while flying the MMU.
SPACECRAFT    Well, in human terms, I was most impressed by the spectacular panorama that I could see through the wide field of view afforded by the helmet. I recall seeing the east coast of Florida go by and the view was simply spectacular. The sensation of floating freely in the MMU and flying was not a great deal different from the sensation of floating freely here inside the Orbiter but it was one of realizing that you had control over where you were going and of your maneuvers. So I was very pleased both as an engineering test pilot with the performance of the unit and very pleased to have had that personal experience.
SPACECRAFT  I guess my impressions were of the immensity of the entire universe...

END OF TAPE
... very pleased both as an engineering test pilot with the performance of the unit and very pleased to have had that personal experience.

SPACECRAFT I guess my impressions were of the immensity of the entire universe, of looking around here and just seeing the circle of the earth, the horizon thinking what a beautiful earth, what a beautiful flying machine and what a lovely MMU.

PAO Martin Gaines, CBS News.

MARTIN GAINES (CBS NEWS) To the same gentlemen, I'd like to ask whether there was any sensation whatsoever that you were really drifting along at over 17,000 miles an hour. Did you feel that you were moving rapidly through space?

SPACECRAFT Feel is not the right word. You certainly can look down at the ground and tell that you're going very fast. I guess it depends where your vision is focused. If you're looking down at the ground, the speed is obvious. If you're focusing on the Orbiter working in close to the bay, then your mind is transformed from going 17,000 miles an hour to going 1 or 2 feet in a second.

PAO Jules Bergman,

SPACECRAFT I guess the closest analogy that I could make, which I think I mentioned over the air to ground link, was of being in an observation type helicopter or other bubble nose airplane going at Mach 25. It was really spectacular. The ground and the continents and the oceans just sped by you with outstanding visibility.

PAO Jules Bergman, ABC News.

JULES BERGMAN (ABC NEWS) For Bruce and Bob Stewart again. How well did the MMUs operate during the free flight and would you pronounce them ready for the solar max mission?

SPACECRAFT They operated absolute superbly and very much like the simulator that we trained on in Denver and yes, in my opinion, they're ready for the solar max flight.

SPACECRAFT Yes, I concur.

PAO Olive Talley, UPI

OLIVE TALLEY (UPI) For Vance and Hoot. Are you ready for a Cape landing tomorrow? Have you gotten an updated weather report and have you been given the go ahead for a Cape landing tomorrow?

SPACECRAFT Sort of in reverse order. No, we haven't, have not
been given a go ahead and as far as an update, no we have not had one today. We understood yesterday that Cape weather was looking good. We're definitely ready. Just a question of will the weather be ready.

PAO Roy Neal, NBC

ROY NEAL (NBC) Okay, this is for Ron McNair. Ron, can you give us a handle on how well that arm, the RMS, performed and the cameras. It seemed down here as if you were constantly having trouble with both.

SPACECRAFT The arm performed very well. I did not have any trouble with the arm itself during the first EVA. The camera on the arm, I take it if that's the one you're speaking of, did have some difficulties late in the second EVA. But during the first EVA, while we were doing the manipulator foot restraint work, there were really no problems. We did have a failure later on during the second EVA, but while the arm was working well, it functioned quite properly.

NEAL I was referring to the fact that we saw cameras such as camera delta which were out. We saw a fix made on a helmet camera by beating on it. I'm referring to the fact that the arm was unable to rotate the SPAS during the second EVA. That's what I'm talking about, Ron.

SPACECRAFT Okay, yes, we did have a few problems with the payload bay cameras. Camera delta was unable to have any tilt. We did have some slow pan capability. Cameras on the aft bulkheads were out of view of most of the activity taking place in the forward end of the payload bay. And the RMS elbow camera eventually had some problems. It was giving us some good views earlier in the second EVA. So we did have a few camera problems but we did maintain enough capability to downlink some good TV, I think.

PAO John Getter, KHOU television.

JOHN GETTER (KHOU) For the Payload Specialists, Bruce and Bob in particular. Now that you have done your MMU test, now that you have done the refueling tests, how difficult or easy do you think it's going to be for you and your cohorts to go permanently into the satellite repair business.

SPACECRAFT Well actually, we're along on this one as Mission Specialists. We had Payload Specialists on the last flight. The completion of the MMU checkout and refueling DTOs will allow us to capture, stabilize and service satellites that are in an orbit that is currently reachable by the space shuttle or that operate at length from ...END OF TAPE
-- (garble) stabilize and service satellites that are in an orbit that is currently reachable by the Space Shuttle, or to operate at length around something like the Space Shuttle, or to operate at length around something like the space station whose construction we have now started. So yes, I would say it has very definitely opened the door to on-orbit servicing of satellites.

PAO

Susan Starnes (KPRC) Television.

STARNES This is for Bruce and Bob. Yesterday, we heard some comments that you seemed cold in particular inside the space suit when President Reagan called. Could you comment on the comfort of the working conditions inside that space suit yesterday?

SPACECRAFT Of course, I'd be glad to Susan. One thing that you have to bear in mind is the actual physical workload associated with flying the MMU is very low. My medibolic rate was very low. We were going through some engineering evaluations which by their very nature were intended to be slow and deliberate maneuvers where we put in a little impulse and watch what happens to the maneuvering unit, and I was hanging out over the edge of the payload bay for quite some period of time with all of my lower torso exposed to radiation to space, and I did get quite chilly during that period of time, but it certainly was nothing that was unendurable.

STARNES So you don't think that this would be a problem for future people working out in space on satellites.

SPACECRAFT No Susan, but by the same token, I was working at a rather high metabolic rate inside the bay on the hydrazine transfer stuff, and I was quite warm and comfortable at the same time.

PAO Silvon Rodriguez.

At the very least, you could wear long underwear.

For Vance Brand, there have been a few disappointments like the IRT and the wrist not working properly. What would you characterize, speaking for the crew, as being the major disappointment so far.

SPACECRAFT The major disappointment is the fact that, although they were deployed okay, the satellites didn't get into orbit. That's -- that was what I call an extreme disappointment. Next to that, I guess the IRT and the RMS wrist sort of ranked together. However, I think, although these were latter to things for disappointments, we accomplished what was needed to be accomplished to start the next mission into motion.
in satellite repair, we could have done some other things, but they -- you could say they would have been frosting on the cake.

**PAO**

John Petty (Houston Post).

**PETTY**

For Ron McNair. Can you give us an update on the rats. Are you seeing any difference in the behavior of the arthritic rats than you might expect on Earth?

**McNAIR**

As a matter of fact, I've seen some pretty dramatic differences, I had the opportunity to observe a similar experiment on the ground for a couple of weeks, and I would say that the rats that we had here on orbit are probably much much better off than ground controlled. I have seen very little detectable migration of the (garble) to compare from the PAW, that was affected with the arthritis to the opposite paw. There's been very little migration, as opposed to what you see on the ground with similar situations, so I'd say that experiment is showing some promise, and it will further about will have to await further announcements before any conclusion can be made. In fact, you can't really make any conclusion based upon this very limited experiment with only 6 flown animals, and several ground controlled, but it would take a much larger scale experiment to come up with any conclusive results and I think from here we'll go on and (garble) experiments and perhaps come up with some useful data and information.

**PAO**

Dave Jackson (Time Magazine)

**JACKSON**

To Bruce McCandless and Bob Stewart, again. I've always been curious how someone's expected to have an adventure up in space like you guys enjoyed, and then fall asleep a couple of hours later. Did you having any trouble getting to sleep and what do you dream about after you have a real life adventure like that?

**SPACECRAFT**

No, I haven't had any trouble sleeping up here. Basically, at night, we darken ship, turn out the lights, rig the sleeping bags, have a nice dinner, and sack out. The overall, if I could call it routine or protocol for an EVA, turns out to be --

**END OF TAPE**
SPACECRAFT ...and sack out. The overall, if I could call it routine or protocol for an EVA, turns out to be fairly physically demanding starting with the preparations a couple of hours ahead of time and getting into the suits and getting the airlock depressed, and various other things. So that even though I mentioned the metabolic rate while actually flying the MMUs was quite low. After a 6-hour EVA which, is about what ours turned out to be, you are tired and you fall asleep quite satisfactorily. And as far as dreaming about things, I very rarely have dreams so I don't have anything to comment on. I just sacked out and work up the next morning.

PAO Carlos Byars, Houston Chronicle.

BYARS For Bruce and Bob. The, I was wondering how well the MMU handled compared to the many simulations that you've been through. Was it easy as you expected? It seemed to be extremely smooth, but how did it compare with the many simulations you've been through?

SPACECRAFT Well, Carlos, I would say the dynamics are very similar to the SPS in Denver. I think it does an excellent job of duplicating the orbital mechanics, the very sense of the dynamics of the MMU itself. The one thing that -- two things that I did notice about it is, that are not modeled on the simulator, are, well, when you're maneuvering in translation with the attitude hold on, the machine has a mode when it conserves fuel by turning jets off, so you can get a jet shattering effect that is not modeled on the simulator. That surprised us at first until we found out exactly what was happening. And the second effect is that at the simulator in Denver you can hear several motors and feel several motors turning, where you couldn't up here, it was just extremely smooth.

PAO Craig Covault, Aviation Week.

SPACECRAFT I agree 100 percent with Bob there. The other thing that had been a big question is whether we would be able to tell when the thrusters were firing or not, since tests in the thermal vacuum chamber in Houston indicated that the noise in the suit was sufficient to mask the thruster firing noise. I found that I could sometimes hear what I figured was gas flowing, but I could certainly tell when the thrusters were firing and that the suit actually was a lot quieter in operation here at 12.3 psi and in vacuum than it was previously. So with those comments, I think the simulations that we'd gone through were quite representative and gave us excellent training to fly the mission.

PAO Craig Covault Aviation Week.

COVAULT For Vance and Bruce. The maneuver to pick up the foot restraint was a pretty interesting thing to watch and I know
you had considered that type of activity as somewhat of a rescue mode, could you take a minute and discuss what you went through to go retrieve the restraint?

SPACECRAFT  Well, after we saw it floating very slowly up out of the bay, we thought about it for a minute, wondering whether we ought to let it go or go after it and decided that after quickly checking with Houston and telling them what we were up to, that -- we had all the capability to go after it, so why not. We just had to set a couple or three switches and move a translation control handle on the left and actually look at it and approach it, like you would flying a lot of other types of vehicles. And when we saw it coming back our way into the bay, why, we just let it slowly drift into the bay. Bruce immediately saw what was going on and headed over to -- well he actually scrambled down the side of the bay toward it and he got to the end of a wire that was a safety wire and couldn't go any further so he just waited for it to drift into his hands. And basically, it came as a complete surprise but we sort of think it was a blessing because we, we always have to be ready to rescue a crewman, for example, should a tether break, which is unlikely. of course, or a backpack go out of control. That is our, always our ace in the hole, and it was shown that that could be done.

PAO  Susan Reed, Cable Network News.

REED  This is also for Bruce McCandless and Bob Stewart. Putting your spacewalk in an historic perspective, do you think that history...

END OF TAPE
This is also for Bruce McCandless and Bob Stewart. Putting your space walk in an historic perspective, do you think that history will consider it as significant as the Wright brothers' first flight?

No. I don't think it's as significant as the Wright brothers' first flight. What we've been doing is just incrementally advancing the state of our capabilities in extravehicular activities, or spacewalks. This one was a significant increment, but I don't put it in the same category as man's first flight in an airplane. And I would, at the same time, point out to you the fact that although Bob and I and the rest of the crew have been highly visible during all this operation, there are literally thousands of other people down on the ground that have put a lot of effort into developing the Orbiter and the pressure suits themselves, which worked flawlessly in the maneuvering units, and all of the other pieces of hardware, Susan.

Okay, here's one for Hoot Gibson, and for, I guess you, Bruce, or Bob. Because we're told those communication satellites, Westar and PALAPA are in low Earth orbit, and because they are apparently healthy, would you discuss for us the feasibility on a future flight of going out to pick them up and rescue them, especially in view of the save from yesterday.

Well Roy, we don't have a real good feeling for that right at this time, but it would appear that with the type of orbit that they're in, about a 150 mile by 600 mile orbit, we'd have a very difficult time getting to them. So I don't think that we hold a whole lot of hope for them at this point.

If you could get to them though, Bruce or Bob, how would you feel about trying to pull something like that in, something that doesn't have any grapple?

The fact that it doesn't have a grapple fixture, is not in itself a problem because as you saw on both of our EVA's, with a device such as the trunnion pin attachment device, affectionately known as the TPAD. We can attach a grapple fixture to just about anything using the maneuvering unit. More permittable is the fact that these satellites were, and I presume still are, rotating at approximately 50 rpm. They're spin stabilized satellites so that we would have to develop a technique for attaching to them, and I'm not sure that 50 rpm is within the capability right now of the maneuvering unit to match rates and attach a grapple fixture. That's a little bit speedy. The other thing is that we would then need some sort of
special cradle or support equipment in the payload bay so we could bring them back to Earth. I think when you add all this up, you would say that it was technically feasible, although difficult, and of course, difficult translates into expensive, so that it probably isn't something we're going to go do.

PAO

CHRIS PETERSON, KTRH Radio.

PETE RSON For Vance Brand. Vance, you've sounded like you've really been enjoying yourself up there. Are you going to get back in the back of the line and get in line for another flight when this is all over?

SPACECRAFT Well, that's really up to NASA management, but I'd really like to. I can't tell you how great it is up here. I think a lot of you would really enjoy it. We sure do.

PAO

LYNN SHERR (ABC News)

SPACECRAFT Hey, Vance isn't the only one that's enjoying himself up here.

SCHER L This is for Bruce and Bob. Gentlemen, when you were on the MMU's, you were variously described on Earth as being human satellites, as being Buck Rogers people. Can you tell us how you thought of yourself while you were out there?

SPACECRAFT Well, I thought of myself as an engineering test pilot evaluating a very high and fast flying machine of a quite unusual design.

SPACECRAFT But in the cabin here, they call each other Flash Gordon and Buck Rogers.

PAO

Craig Covault, Aviation Week.

COVAVLT Another one for Bruce and Bob. One of the questions we had before you flew was whether or not spending some time in zero g before going out and flying MMU's would bias your ability to tell how fast you were going. Did you notice any change?

SPACECRAFT No, Craig. I didn't notice any change. You've got to bear in mind, of course, that what we were using as our reference was the Orbiter - -

END OF TAPE
COVAULT ...before going out and flying MMU's would bias your ability to tell how fast you were going, did you notice any change?

SPACECRAFT No, Craig, I didn't notice any change. You've got to bear in mind, of course, what we were using as our reference was the Orbiter and concentrating on landmarks on the Orbiter and things of that sort to judge our relative motion. I guess I would have to say though that I think that, apart from the zero-g, spending a day or so up here and getting used to the fact that you can see the Earth going by at great speed and random attitudes before setting out into the maneuvering unit certainly made me feel a lot more comfortable while I was flying around out there. And that's a visible effect that we have not reproduced on any of our simulators.

PAO Mark Kramer, CBS News.

KRAMER For Vance Brand. There's been a lot of coverage down here on earth talking about a trouble-plagued mission, and I wonder if the difficulties you've faced with the satellite failures, the IRT, and yesterday the arm, have led to a pall on the part of the crew. Have you had to fight off a depression from these difficulties, or have you carried on without that hanging over your head.

SPACECRAFT Well, of course, up here we, we don't know what is in the papers and what is being said so I guess we find that out when we get back. I must say the first couple of days, we were thinking of a satellite deployments, we were very disappointed to hear that the satellites didn't get into high orbit and somewhat surprised because everything appeared to have gone perfectly through the whole operation, from our viewpoint. The -- we did get into other things immediately, the rendezvous. I think we didn't get everything done we wanted to but we, we really were pleased the way the equipment worked, the radar and the sensors we have that we used, like the star tracker. Finally, really the EVA's, I think we've been on top of the world, since they came off because those were very exciting things to pull off up here. I think we feel threr's been some adversity but a lot has been accomplished.

PAO Susan Starnes, KPRC Television.

STARNES Past crews have reported sights they felt were amazing or shocking looking back at the planet. For the flight crew, could one of you or all of you describe anything that you have seen, that you felt was shocking about the planet, perhaps amazing or strange?

SPACECRAFT We're all shaking our heads and trying to see if we can think of anything that we've seen that was strange or
shocking and none of us are, I don't think, coming up with anything that was like that, I think the one impression that we do get is just how much beauty the Earth does have. Looking at the oceans and the cloud patterns and the continent and, as Bruce and Bob have referred to, the magnificent view that you get from up here. I guess that's probably been the most striking thing that we've seen.

PAO Jules Bergman ABC News.

BERGMAN This is for Bruce and Bob and then Vance and, that's not legal John?

PAO Two.

BERGMAN You two have the only time in the MMU. How anxious are you to go up and fly it again and do you feel NASA should put you ahead of the next crew since you're experienced in flying it?

SPACECRAFT Well, of course, that's a, a call for NASA management to make; however, perhaps in a self-defeating mode, let me say that we have endeavored in the development of the MMU, myself and Ed Whitsett in crew systems division and others, to try to make the MMU easy to fly. We have tried to use what we call the rent a car concept so that if somebody were proficient in flying the spacecraft or spacecraft simulator in general, with relatively small amount of training, they could do a good job in the MMU. And I have a great deal of confidence that the next crew, George Nelson and James Van Hoften will do a super job on the solar array repair mission using the MMU.

PAO Sylvan Rodriguez KTRK television.

RODRIGUEZ This is also for Flash and Buck. The MMU at the beginning I think there was a little rattling described down here on Earth, can you provide us with a little more detail on that and did anything at all go wrong with the MMU, a thruster sticking, or any problems at all.

END OF TAPE
RODRIGUES The MMU, at the beginning I think there was a little rattling described down here on Earth. Can you provide us with a little more detail on that, and did anything at all go wrong with the MMU, a thruster sticking, or any problems at all?

SPACECRAFT With regard to the rattling, when you translate you've put four thrusters, and since the center of gravity of the unit varies depending on the weight of the person, his size, and whether you have something like the trunnion attachment device hung the front or not, in order to keep your attitude pointed in the right direction, the system automatically turns appropriate thrusters off for 40 or 50 milliseconds, and then back on. It does this on the simulators also, but the cue lights stay on constantly since there are some thrusters on, at least at all times, and the response of the simulator is slow enough so we have not put that in. Basically, it was just a little bit of a surprise that we felt this rattling as the system performed its intended job of saving propellant, and holding attitude. The second part of your question, no we really haven't found anything on the MMU's that was performing off-nominally, and we've had no fears.

PAO John Getter (KHOU Television)

GETTER Along the lines of what Hoot addressed earlier. Those who have come before you have come back and said they gained unique insights. Dick Truly said he was struck by the fact there were no borders visible from space. Paul Weitz came back and said that he was struck by how small the Earth is and that we had better do something about the environment. For anyone who would care to address it, have any of you from your unique perspective gained any new insights that you perhaps did not expect.

SPACECRAFT I guess one reason they were kind of hesitant to answer that question is that we've benefitted from the experiences and the debriefings of all the crews that have flown before us, and trying to report on a new significant insight that these guys haven't seen and reported and we were expecting is quite challenge.

SPACECRAFT I think - I've had a chance to be up here before, and I think it's - each time is just like the first time, almost. I'm so amazed at how the world is put together. It's - you know we talk about overcrowding, yet we crossed vast oceans and deserts and mountain areas (garble), the largest cities looked like very small areas on a continent, and it really puts me to thinking that our problems on Earth aren't that we're short of land, it's that we're short of water to make things grow in the deserts, and we're short of electrical power to pump the water uphill perhaps, and to (garble) water. If we had unlimited electric power and a lot more technical capability. We've got a
lot of land on Earth that presently is unusable, which we can see from our windows here in the spacecraft, that would really help mankind. I don't know how you get this technology, but unlimited electric power would make it possible for several times the population of the Earth to exist on the Earth.

PAO Sounds like we have less than 30 sec. Olive Talley, UPI.

TALLEY Well, I hate to end it on this note, but Hoot or anyone else, how troublesome have the toilet problems been during the flight, and would you recommend any design changes in that piece of equipment?

SPACECRAFT We have had, I guess what we'd have to characterize as perhaps a minor problem with the WCS or Waste Control System. It's presently operating very nicely and it's the sort of thing that I guess it takes a little bit of attention to keep up with it and keep the thing operating properly. I think it could bear a couple of changes that would make it a whole lot more reliable and a lot more long lasting, but it has served us relatively well, I'd have to say.

PAO We'll take one last question. Roy Neal, NBC

NEAL All right. Ron McNair, we haven't heard very --

END OF TAPE
NEIL All right, Ron McNair, we haven't heard very much from you and I wonder if perhaps you could give us your evaluation of this mission? I'm looking at the fact that you are a scientist, you've been there and, of course, I'm not looking for the application to solar max, we've already heard that, but I mean the overall applications as you see it to this mission?

SPACECRAFT Okay, the, of course I too, I was involved with the PAM deploy and was very shocked and surprised that they did not function properly. That was a disappointment at the beginning, however, as the mission progressed, we had a great deal of success in the areas of experiments, we have a number of experiments on this mission that have sort of taken a back seat to the more photogenic and media catching events such as the MMU's and so forth but the experiments have gone very well with lots of promise for the future in applications. We've also flown the SPAS 01 satellite which has a lot of experiments, they have gone very well, and the EVA's were a great success as I was personally involved with the first checkout of the manipulator foot restraint in which we drove Bruce around in the work station which will also be applied to the solar max mission. That proved to be a very, very well designed, well thought out piece of hardware, it's going to be very useful to us and it was fun testing it and maneuvering it around the bay. In general, my perspective as are other crewmen is that we've had a really useful, we've had a really productive mission in spite of the failures and minor setbacks that we have undergone. All in all we've accomplished some good science, we accomplished that, we demonstrated the solar max mission is a viable endeavor and we think that our main objectives were accomplished allowing the fact that though we had a good deploy, the satellites did not reach orbit, but all in all we had a good mission, we think.

PAO Crew aboard the Challenger, thank you. Ladies and gentlemen of the press, thank you, we're adjourned.

SPACECRAFT Okay, we enjoyed it.

CAPCOM Challenger, Houston, we're still back with you and just be advised you're live TV on the middeck still. You look good, Ron. And Challenger, Houston, we have turned off the TV downlink and we're just standing by whenever you can get started with the unberthing of the SPAS.

SPACECRAFT Okay, John, I'm just upstairs getting ready to start throwing some of the switches on that and the expression unberth the SPAS is probably not what you mean to say, is it?

CAPCOM No, I, yes, that was the title of the whole thing, you got it Hoot, step 2.
SPACECRAFT: Okay, that's right, I'm going to do only step 2 and not step 3.

CAPCOM: That's affirm.

PAO: This is Mission Control Houston, Challenger, pilot Hoot Gibson will be activating the SPAS experiments and it's going to be meal time onboard the vehicle and they'll be having their noon meal for the day, Mission Elapsed Time is 6 days 23 hours 31 minutes, this is Mission Control Houston.

SPACECRAFT: Houston, Challenger, we're still working on getting some decent TV scenes for you before we pop those umbilicals.

CAPCOM: Roger that. Challenger, Houston, we are seeing it good, we're 3 minutes to losing the picture, we'd like you to proceed.

SPACECRAFT: Okay, we're proceeding. Okay, John, I think we've got you a split screen on both sides now. And Houston, you're ready for the retracks?

CAPCOM: Roger, we're seeing a split screen and we're ready. Roger, we saw it and thank you very much, we're going LOS here in one --

END OF TAPE
SPACECRAFT  Houston, are you ready for the retracts?

CAPCOM       Roger. We're seeing a split screen and we are ready.

CAPCOM       Roger. We saw it, and thank you very much. We're going LOS here in 1 min. We will see you next at Guam at 00+01.

SPACECRAFT  Okay, John, we'll see you there, and I'm not proceeding on to step 3.

CAPCOM       That's affirmative, and as you go LOS here, we would like you to take the S-band PM antenna and select GPC. If you have any comm problems doing subsequent TDRS passes, then cycle through all the positions and then back to GPC.

SPACECRAFT  Okay, John. Will do.

PAO          Mission Control, Houston. We're LOS through the TDRS. Don't acquire signal again until we encounter Guam in almost 20 min from now. Mission Elapsed Time is 6 days, 23 hr, 41 min. Mission Control Houston.

PAO          This is Mission Control Houston. Challenger is on the ascending node of orbit 113 and we're a minute away from Acquisition of Signal through Guam. The Change-of-Shift Briefing scheduled for 8:30 a.m. with Flight Director, Gary Cohen should occur on time this morning. Mission Elapsed Time is 7 days even. This is Mission Control, Houston.

CAPCOM       Challenger, Houston's with you through Guam for 7 min.

SPACECRAFT  Roger, Houston. Loud and clear, and -- standby.

CAPCOM       Roger, and we are sending you a new state vector.

SPACECRAFT  Okay, good John, and how about the weather? Could you give us a weather report on the Cape, what's expected tomorrow? The press asked about that and we are curious.

CAPCOM       Roger, Vance, the forecast right now is good, and we'll put together some details for you.

SPACECRAFT  Super.

CAPCOM       Challenger, Houston. I have a configuration for you over on RL when you're ready.

SPACECRAFT  Okay. Let me head that way.

SPACECRAFT  Okay, John, go ahead with RL.
CAPCOM    Roger. We need you to take the APU fuel pump valve cool bravo to off and the controller power to off on APU 1.

SPACECRAFT  Okay, John. I took off the APU pump valve cool number bravo to off, APU controller number 1 is off, and what about the (garble) controller power, I guess we leave those running for the heater?

CAPCOM    That's affirmative.

SPACECRAFT  Okay. Thanks, John. That's done.

CAPCOM    Roger that.

CAPCOM    Challenger, Houston. We're going LOS Guam in 30 sec. We'll see you at Hawaii in 7 min.

SPACECRAFT  Roger, John.

SPACECRAFT  Houston, Challenger.

CAPCOM    Roger. Go ahead.

SPACECRAFT  Hey John, we still got the teleprinter down using the speaker mike down here on the lower deck. Give us a call before you send the teleprinter message, please. Over.

CAPCOM    Understand.

PAO    This is Mission Control, Houston at 7 days, 0 hr, 14 min Mission Elapsed Time. Just about a half a minute away from Acquisition of Signal through Hawaii for a pass of 7-1/2 min duration, then a brief gap and we'll pick up TDRS coverage again.

END OF TAPE
PAO   -- 1-1/2 minutes duration. Then a brief gap and we'll pick up TDRS coverage again.

CAPCOM   Challenger Houston is with you at Hawaii for 7 minutes.

SPACECRAFT   Roger John, we got -

CAPCOM   Your loud and clear, and at your convenience you can configure the teleprinter for ops.

SPACECRAFT   Okay, I guess what we were saying is we'd like to use the speaker mikes for a while longer so, when you need to send us a teleprinter message to give us a yell, and then we'll reconfigure teleprinter.

CAPCOM   Roger that, we'll do that.

SPACECRAFT   John, are you trying to tell us that you need to send us a letter message right now on the teleprinter or when will that be up?

CAPCOM   Negative, we don't have anything to send you now, we will give you a call if we need the teleprinter.

SPACECRAFT   Okay, thank you very much.

SPACECRAFT   Houston Challenger, I'm trying to recall where we wound up with, with respect to waste water dump. The waste water dump system is operable, isn't that true?

CAPCOM   That is correct, it is operable.

SPACECRAFT   Okay, great, thanks John.

CAPCOM   And be advised we're going to be turning the PSP off, and are - we want you to turn the PSP off and when you do that, we will get an air message.

CAPCOM   Let me rephrase what I just told you. We are going to turn the PSP off, and you will get an air message.

SPACECRAFT   Okay, (garble) in command.

CAPCOM   Roger that. Challenger Houston we're going LOS Hawaii in 30 seconds, we'll see you up TDRS in a couple of minutes.

SPACECRAFT   Okay John, see you there.
PAO This is Mission Control Houston, at 7 days, 0 hours, 22 minutes, Mission Elapsed Time. A reminder the change of shift briefing with Flight Director, Gary Cohen, will occur on time at 8:30 am Central Standard Time, and this will be the last opportunity the media will have to query the Flight Director for entry. So entry day questions are going to be most appropriately and most effectively handled during this press conference. We'll have AOS again through TDRS in less than half a minute. Mission Control Houston.

CAPCOM Challenger Houston we're with you over Goldstone UHF, we ought to be picking TDRS up when we stop blinking.

SPACECRAFT Hello, roger John, we got you on UHF.

CAPCOM You're loud and clear. Challenger Houston, we have a good TDRS lock now.

SPACECRAFT Roger Houston.

CAPCOM Challenger Houston, I hear you loud and clear, we've had TDRS dropping in and out.

END OF TAPE
CAPCOM Challenger, Houston, we have a good TDRS lock up now.

SPACECRAFT Okay, John.

PAO This is Mission Control Houston, at 7 days, 1 hour, Mission elapsed time. The Challenger is out over the south Atlantic right now on orbit 113. According to the timeline the crew should be having there noon meal. Most of the day today is preparations for the entry tomorrow. Most of the crew members have some exercise period scheduled and a good portion of the day taken up with cabin stowage, putting away all the experiments, that sort of thing, and we have a change of shift briefing, coming up in about a half an hour, at approximately 8:30. This is Mission Control Houston.

CAPCOM Challenger, Houston, we may lose you here with TDRS, we'll try to pick you Botswana UHF. If we drop out of contact with you, we see you next at Guam, at 1:36. Challenger Houston with you, with TDRS, we may get blanking here, if we go LOS within the next 5 minutes, we'll see you at Guam next at 1:36.

SPACECRAFT Roger, Houston, understand, and you're echoing, understand.

PAO This is Mission Control Houston, at 7 days 1 hour 17 minutes, mission elapsed time. Challenger has passed beyond the range of the tracking data relay satellite, out over the India Ocean, on orbit number 113. We'll pick up again in about 19 minutes, through the Guam station, handover currently in progress here in Mission Control. We believe the change of shift press conference with the off-going Flight Director, Gary Coen, scheduled for at 8:30 will be close to on time this morning, over in the building 2, press conference room, 135. Mission Control Houston, 7 days 1 hour 26 minutes. We'll be having the change of shift conference with the off-going Flight Director, Gary Coen, coming up very shortly, the Flight Director is about to leave from Mission Control to walk over to the press conference area. This will be opportunity to ask questions about entry, get all the good numbers for the expected entry tomorrow. Flight Control teams are presently handing over here in Mission Control. The Orbiter systems looking very good a few final tests that some people want to get in here, the last day of the flight, working those with the Flight Director. The crew earlier in the day used auxiliary power unit number 1, for the flight control system checkout. That checkout was reported as successful, and everything looks normal, and ready for entry. Flight Dynamic Officers reports that the Challenger's orbit is 146 by 156 nautical miles.

END OF TAPE
Flight Dynamic Officer reports that the Challenger's Orbit is 146 by 156 nautical miles. And the deorbit to the Kennedy Space Center tomorrow will be a 2 engine OMS burn with a change in velocity of 317 feet per second. Weather at Kennedy Space Center, predicted to be good. Cloud deck at about 3500 feet scattered clouds, with over 7 miles visibility. Winds predicted to be fairly slight. And the landing on runway 115 projected. This is Mission Control 7 days 1 hour 33 minutes, mission elapsed time. We're coming up on a pass over the Guam station here in just a couple of minutes, change of shift press conference with off-going Flight Director Gary Coen, be getting underway about 8:40. The Flight Director is on his way over now from the Control Center to the press conference area. Handover is now complete here in Mission Control Center. Orbiter systems look good, and the primary activity is making sure that the spacecraft and the crew are ready for tomorrow morning's entry. Flight control system has been checked out and looks good, and the crew is proceeding with their cabin stowage, putting away the cameras, the experimental gear, all the items, all the flight books that they keep out during the flight. Getting a little exercise, having their noon meal, and taking a little bit of last minute 16 millimeter footage, and some little photography.

Challenger, Houston, Guam for 7.

Hello, Jerry, loud and clear.

Roger, good morning.

Is it still morning?

Last time I was outside the building, it was here.

Heck, it's late afternoon.

Challenger, Houston, we'd like to request a DAP configuration change.

Okay, stand by one. Okay, go ahead.

Okay, we're changing the DAP to get some engineering data and also to conserve a little bit of prop. We would like to go to the Al DAP, and set the normal deadbands to 10 degrees, please.

One DAP, 10 degrees deadband, okay.

Challenger, Houston, 30 seconds to LOS Guam, Hawaii in 6.

Okay, Jerry.
CAPCOM       Challenger, Houston, Hawaii for 7 1/2.

SPACECRAFT   Thank you.

CAPCOM       Challenger, Houston, going over the hill Hawaii, we'll give you a call once we establish TDRS.

SPACECRAFT   Okay.

CAPCOM       Challenger Houston

END OF TAPE
PAO  This is Mission Control Houston at 7 days, 2 hours, 8 minutes mission elapsed time. Information for those of you in the Houston area about the visibility of the Orbiter as it crosses over. We expect that the Challenger will be visible in the Houston area beginning at approximately 5:58 am central time. The azimuth on that is 260 degrees. During its pass over the Houston area we'll achieve a maximum elevation of 21 degrees with the azimuth about 170 and should be going out of sight almost due east at approximately 6:05 am. Just to repeat that now in case you didn't get it, it'll first become visible at about 5:58 coming out at about 260 degrees. It will achieve the high point in the sky that crosses over the Houston area of about 21 degrees with the azimuth about 170 degrees and it will disappear over the eastern horizon almost in a due easterly direction at approximately 6:05. We are standing by for the start of the LDEF press conference now from KSC. This is Mission Control.

CAPCOM  Challenger, Houston, through TDRS and we see an H2O message.

SPACECRAFT  Yes, Jerry, that came on a little while ago and it apparently was the, let's see which one was it, the dump line temp.

CAPCOM  Okay, Hoot. We'd like you to go down to ML86 bravo, row A and push back in the main A H2O line heater alpha and we'd also like a status of that same heater, the bravo circuit.

SPACECRAFT  Okay, Jerry. The bravo circuit breaker is in. Pushing the A in now.

CAPCOM  Okay, thank you, and we'll watch it.

CAPCOM  Challenger, Houston. 8 minutes till LOS TDRS. Guam next at 03 13. Request MAD strain gage PCM enable on A7, please.

SPACECRAFT  Roger, understand MAD strain gage is enabled, Jerry, and we'll talk to you then.

CAPCOM  Okay, Bruce, and that's to the PCM enable position.

SPACECRAFT  In PCM enable.

END OF TAPE
This is Mission Control Houston 7 days 2 hours 45 minutes, mission elapsed time. Challenger crossing the coast over the eastern edge of the southern part of Africa. On the last part of orbit 114, things are very quiet aboard the Challenger right now, the crew is proceeding with putting away all the equipment, books, and associated equipment. Getting ready for the entry tomorrow morning. Things are also very quiet here in Mission Control Center. Flight Controllers here, just primarily keeping a watch over systems, make sure everything remains in good condition. Everything was in good shape as we got the status during the handover time. Challenger is in an orbit of 146 by 156 nautical miles. We have about 4 minutes remaining in this pass under the range of the tracking data relay satellite. And then we'll have loss of signal period of about 22 minutes, before picking up over the Guam station. At 7 days 2 hours 47 minutes, this is Mission Control Houston.

Challenger, Houston, Guam for 5 minutes.

Hello, Jerry, we got you at Guam, and we're getting caution and warning parameter number 4 toggling on us, which is cabin press, and we're showing 13.9 in the cabin, and a PPO2 at 2.81 off the B sensor. We believe we ought to pump O2, how about asking ECOM what we ought to do.

Okay, Hoot, we recommend performing manual cabin atmosphere management, Orbit OPS checklist, 5-10.

Okay, we got that page open.

Challenger, Houston, got a couple notes for you.

Go ahead.

Okay, Bruce, first one is, be advised we're going to TMBU the H2O align temp parameter that we - continues to trigger the caution and warning messages on us. We'll be watching it on the ground, it appears the heater's working fine, it just happens to be controlling to the wrong temperature band. Second item, on panel R1, we'd like to take cryo O2, tank 2, heater alpha to off, reason for this we're seeing a divergence between tanks 1 and 2, in quantity, approximately 3 1/2 hours from now we'll give you a call back to turn that back on.

Okay, it's off, and we'll turn it back on, on your call. We've inhibited the pressure caution and warning parameter so we can talk to you this pass and we're proceeding into the manual cabin pressure regulations.
CAPCOM    Okay, copy that, Bruce, 15 seconds to LOS Guam, Hawaii in 8 minutes.

SPACECRAFT    Jerry, we got you in the spock.

PAO    This is Mission Control Houston, 7 days 3 hours 20 minutes, mission elapsed time. Challenger had a brief pass over the Guam station. We'll pick over Hawaii in about 5 1/2 minutes. For a pass of almost 8 minutes in duration. During the Guam pass we heard Astronaut Bruce McCandless talking about making some adjustments to the cabin atmosphere.

END OF TAPE
minutes for a pass of almost 8 minutes in duration. During the Guam pass we heard Astronaut Bruce McCandless talking about the, making some adjustments to the cabin atmosphere. Crew is in the middle of the scheduled cabin stowage activity. And they are generally getting things squared away for the end of the day and the final preparation onboard the Challenger before tomorrow morning deorbit burn and entry, and projected landing at the Kennedy Space Center, assuming the cooperation of the weather. We're about 4 minutes away from picking up over the Hawaii station. This is Mission Control Houston.

CAPCOM Challenger, Houston, Hawaii for 8 minutes.

SPACECRAFT Roger, Houston.

CAPCOM And Challenger, if you're ready to copy we have a S-band test we'd like you to perform, if we don't acquire you within 10 minutes on TDRS.

SPACECRAFT Okay, stand by just a second, Jerry. Okay, Jerry, go ahead.

CAPCOM Okay, guys, if we don't acquire you within the 1st 10 minutes of the TDRS pass this time, we would like you to go on C3, the S-band PM rotary, select each of the positions, pause for at least 2 seconds, and at the conclusion of that go back to GPC. We're trying to get some engineering data to help us post flight.

SPACECRAFT Okay, understand, if you do not acquire us by 10 minutes after predicted TDRS AOS we should cycle the S-band PM rotary switch through each of the 8 positions, pausing for 2 seconds. Do you want us to work for signal strength at each position also?

CAPCOM That's not required, Bruce, if you'd like to, just for your own information, it could help us also.

SPACECRAFT Okay, at the end of that back to GPC what if we still haven't acquired you?

CAPCOM We'll I imagine just like in the past, we'll finally acquire you sometime in the pass.

CAPCOM As we cycle through these 8 positions, are you going to try to grab us when you see signal strength or something?

CAPCOM That's a negative, Bruce, we won't, this is more just an engineering evaluation right now.
STbS-41-B  AIR/GROUND TRANSCRIPT  t425j  041:16:26  2/10/84 PAGE 2

SPACECRAFT    Okay, thank you, and do you have an MET for TDRS AOSlock, I've got (garble) 7 1/2 minutes from AOS right now.

CAPCOM        Roger, 03:35:29 predicted AOS TDRS. Challenger, Houston, 30 seconds LOS Hawaii, TDRS at 03:35.

SPACECRAFT    Okay, Houston. Houston, this is Challenger on S-band over.

CAPCOM        Roger, Bruce, loud and clear.

SPACECRAFT    Okay, Jerry, we didn't get you at 3 (garble) so I started to sweep, I'm now on lower right forward, which has the highest signal strength, so I can read the numbers off to you, and then go back to GPC or whatever you wish.

CAPCOM        Okay, we'd just like you to go back to GPC, Bruce, thank you.

SPACECRAFT    Okay, lower right forward is the magic one right now.

CAPCOM        Okay, copy that.

PAO           Mission Control Houston, 7 days 3 hours 48 minutes, mission elapsed time. Bruce McCandless reporting he's going through the engineering evaluation proceedings with the rotary switch selecting the various antenna's to see which works in what manner. The INCO, the communication officer here in the Control Center, wanting to get some data on what the various readings are from those antennas. The TDRS acquisition lately has not been quite up to par. And they're checking out all the various Orbiter antennas to see what the performance is on each of those.

END OF TAPE
PAO: -- what the various readings are from those antennas. The TDRS acquisition lately has not been quite up to par and they're checking out all the various Orbiter antennas to see what the performance is on each of those.

CAPCOM: Challenger, Houston. Got a couple notes for you.

SPACECRAFT: Roger, Jerry. Go ahead.

CAPCOM: Okay, Vance. First one we'd like to go over on panel L1, take the rad controller outlet temp to normal and then cycle the flash evaporator control primary alpha off then back on.

SPACECRAFT: Okay, that's complete.

CAPCOM: Okay, second item. We would like to send you several teletypewriter messages at Hawaii, next pass, at 05:01 approximate so if you can have it configured for us.

SPACECRAFT: Okay, Jerry.

CAPCOM: And the third item, tell Ron that will be prepared on the next TDRS pass to take some live TV if you'd like to ship some to us.

SPACECRAFT: Sorry, Jerry, would you repeat that, please.

CAPCOM: Okay. For Ron, if he would like to send us some live TV the next TDRS pass we would be glad to get it from him.

SPACECRAFT: Okay. Anything in particular you're most interested in or just let him, let us select.

CAPCOM: We'll let the selections be Ron's choices.

SPACECRAFT: Okay, very good. Jerry, once again, where would you like to see that TV again?

CAPCOM: Okay, Vance, it'll be next rev, the first portion of TDRS while we can have high gain and this is per Ron and my discussions premission on what he would like to show us.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.

SPACECRAFT: Roger. We are in the middle of packing up here. We could send some stuff down to you and, but we might make it fairly short and Ron's had other discussions since those he had with you so he might be sending you some different stuff.
CAPCOM: Okay, there's no need to send us anything. We just thought that he might want to send us something. Otherwise, he can disregard.

SPACECRAFT: Okay, thanks.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.

SPACECRAFT: Okay, since we're not too far from presleep and pretty busy packing up, why, we won't send you anything down at all then. We're going to put the VTR to bed.

CAPCOM: Roger, we concur on that and let us know when the teletype's configured.

SPACECRAFT: Okay. How about sending a test now. Bruce just got it configured.

CAPCOM: Vance, I guess we're not going to be able to do it until we get to Hawaii so hopefully it'll work.

SPACECRAFT: Okay. We'll be watching for it.

CAPCOM: Challenger, Houston. We're 7 minutes till LOS TDLS. Guam for a short pass at 04:52.

SPACECRAFT: Roger. Houston.

END OF TAPE
Mission Control Houston, 7 days 4 hours 31 minutes
mission elapsed time. They have the loss of signal through the
tracking data relay satellite. The Challenger just crossed the
equator, on the northern leg of its groundtrack, just starting
orbit number 116. It's about 30 minutes before we have our next
contact with the crew, and that will occur over the Hawaii
station. This is Mission Control Houston.

Challenger, Houston, over Guam for approximately 1
minute.

Roger, Houston.

Challenger, Hawaii, 7 minutes, we have at 4
messages for you.

Roger, Jerry, we're configured for teleprinter but
till you send us a test or a message we can't be 100 percent
sure.

Roger, Bruce.

Mission Control Houston 7 days 5 hours mission
elapsed time, standing by for acquisition through Hawaii.

Challenger, Houston, Hawaii. We've got 4 messages
to send you and I've got several notes also.

Okay, stand by 1. Go ahead, Houston.

Okay Vance, several presleep activity notes for
you. The first one, R1 02 tank 2, heater alpha to auto.

Okay, I'll go over and get it. Okay, 02 tank 2,
heater alpha to bravo, I mean alpha on, to auto.

Roger that, Vance, second item, we would like to
change the A DAP to alpha 6 and the normal deadband we'd like
sent to 10 degrees.

Okay, I got it.

Further, we'd like to turn manifold L3 R3 drivers
off, and on 016, RJDA, to barvo, L3R3 manifold driver to off.

Okay.

Further on that activity, also we'd like to
override the left and right manifold 3 status to close on spec
23. We'd like to do these activities after the IMU align.
SPACECRAFT  Okay.

CAPCOM    Okay, IMU align is meant to - intend to include also the COAS work. We'd like a status on the GAS activities today, times of doing those, and also I've got a vernier hotfire test if you're ready to copy?

SPACECRAFT Okay, go ahead.

CAPCOM    Okay, Vance, as last evening, the last thing prior to sleep, we'd like to do DAP A manual vern, DAP rotations excel, excel, excel, and the RHC + pitch for 10 seconds, as opposed to 5 last night, and after you've performed that, we'd like to reconfigure DAP, A auto norm, rotations discrete.

SPACECRAFT Okay, Jerry, let me get some of this back to you. On auto 1, I got the heater, called that to you. You'd like soon the DAP to A6 10%, incidentally, when did you want that again?

CAPCOM    Okay, we can reconfigure the DAP and do the manifold work after you've done the IMU and COAS work and that was 10 degrees normal deadband.

SPACECRAFT 16 degrees deadband, so everything that follows is after the final COAS thing.

CAPCOM    That's affirm.

SPACECRAFT Okay, you'd like RJDA 2 to bravo --

END OF TAPE
CAPCOM        is after the final COAS thing.

SPACECRAFT    Okay, and you'd like RJD 2 to bravo, L3R3 off, and
override left and right manifold on spec 23. You'd like a status
for the GAS and vernier hotfire which consists of DAP A, manual
vernier, excel, excel, excel, + pitch for 10 seconds. And back
to A auto normal discrete, discrete, discrete.

CAPCOM        That's a roger on that, Vance, we're sending you
messages 73, which is your deorbit prep switch list update, 74
which is a CAP update, 75 entry checklist updates, and 77 which
is entry weather updates, 76 I think we'll probably have to get
at Santiago, it's a mission summary.

SPACECRAFT    We got them on board all except 76.

CAPCOM        Okay, Bruce, copy that, all except 77 I think you
said?

SPACECRAFT    Except for 76.

CAPCOM        Okay, we won't send it this pass, we'll get you at
Santiago.

SPACECRAFT    And Ron's going to I talk to you about the GAS
activities for today now.

CAPCOM        Okay, ready to copy.

SPACECRAFT    Okay, Jerry, we got group golf 4+54, and that was
the only GAS activity for today, 4+54 for group golf.

CAPCOM        Okay, copy that, thank you, Ron.

SPACECRAFT    And Jerry another development, we managed to get
the VTR to work for us a bit. It was able to do some
recording. We're still unwilling to try any of our flight tapes
on it because it's still in somewhat of an uncertain condition.
However, I did manage to get some recording of the AEM state. I
did not have to go to 16 millimeter, but I got it on tape, I took
a fresh tape and put it in, so just wanted to alert you - inform
you of that. Also, things about a week ago, we were unable to do
what we discussed before I left, thanks.

CAPCOM        Okay, copy that, Ron, we're 20 seconds LOS, TDRS in
about 3 minutes, and I'm sorry I didn't get that word.

SPACECRAFT    Yeah, I hope (garble) town real fast.

PAO           This is Mission Control 7 days 5 hours 10 minutes
mission elapsed time. We have a gap in communications between
the Hawaii station and the tracking data relay satellite.
Mission specialist Ron McNair reporting that he had deactivated get away special group G. That includes get away special 004, payload by Utah State University, composed of 2 experiments, the study of thermal capillary flow in liquid columns, and capillary waves on water surfaces. 3 additional experiments are spore growth, 3 dimensional brownies in motion, and dimensional stability provided by Aberdeen University, of Aberdeen Scotland. Also in gas group G, G309, a payload by the U.S. Air Force, to investigate the probability and incidence of cosmic rays induced errors in memory type intergrated circuits when flown in a Shuttle orbit. Similar experiment was flown on Shuttle flight 8. Also in that group is the G 008, also by Utah State University. The first experiment studies of separation of flux from solder, while soldering in microgravity, and this is a refight of a similar experiment flown on shuttle flight 4. Also in that group gas experiment 349, payload by the NASA Goddard Space Flight Center, to monitor the effects of atomic oxygen erosion. Similar experiment was flown on Shuttle flight 8 in August. These were deactivations of those experiments. They're among a list of items the crew is doing, and powering down any remaining --

END OF TAPE
PAO  -- a payload by the NASA Goddard Space Flight Center, monitor the affects of atomic oxygen erosion. A similar experiment was flown on Shuttle flight 8 in August. These were deactivations of those experiments. They're among a list of items the crew is doing in powering down any remaining items, stowing the controllers for those, putting away their flight books, there TV cameras and all their other associated equipment, packing them up tightly in the lockers for the entry phase tomorrow morning. We're within range of the tracking data relay satellite now, if we had good antenna pattern and Challenger on orbit 116 out over the Pacific, about to cross the equator in a minute. We're at 7 days 5 hours 13 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, on TDRS got a question for Ron, concerning GAS.

SPACECRAFT Stand by. Houston, Challenger.

CAPCOM Go ahead, Ron.

SPACECRAFT You had a question for me?

CAPCOM Yes, that's correct Ron. We'd like to know about the group F GAS activities that was scheduled immediately following post-sleep this morning.

SPACECRAFT GAS (garble) group F down for day 6, 9 + 06. That's right that was earlier today it didn't dawn on me (garble) but I did get that earlier.

CAPCOM Okay, copy, you got that earlier today.

SPACECRAFT I don't have my CAP in front of me, but I believe for the time I have listed as day 6, 19 + 06, I'm sorry.

CAPCOM Okay, that sounds better to us, thank you, Ron, and if someone can give us a GNC spec 1, we'd like to change some variable parameters.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead.

SPACECRAFT Jerry, we just got a backup caution warning alert on PPO2 and the alpha sensor is at 3.60 and it is intermittently hopping up over 3.60 and tripping off the alert. Right now the other sensors, the B reads 3.37, and C reads 3.45. And we have the 02 bleed orifice going, we'd like to know what you would like us to do?
Okay, stand by, I'll talk to (garble). Challenger Houston, for Hoot.

Go ahead, Jerry.

Okay, Hooter, we'd recommend you reset the limits on the alpha PP02 sensor, channel 34 to 3.8 and engineering units to 3.8.

Okay, Jerry, I'll take care of that. Thank you.

Roger. Challenger, Houston, we're going to be handing over shortly to Santiago for your last teleprinter message.

Okay, Jerry.

And also, Hoot, you can have back your spec 1.

Okay, thank you.

Challenger, Houston, be advised we're sending you a new state vector.

Okay, Jerry.

END OF TAPE
CAPCOM Challenger, Houston, be advised we're sending you a new state vector.

SPACECRAFT Okay, Jerry.

CAPCOM Challenger, Houston, through Santiago, you should have a message coming up shortly.

SPACECRAFT Okay, Jerry, we'll look for it.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Vance.

SPACECRAFT Jerry, just did an IMU align did you copy the numbers?

CAPCOM Roger, Vance, it looks to us like we may have not seen the torquing of the IMUs.

SPACECRAFT Okay, might have miskeyed it. Okay, Jerry, just as I was about to hit item 16 execute, we got a RM fail IMU 1. I guess, with your permission, I'll hit the execute and we'll align it.

CAPCOM Okay, stand by, Vance. Okay, Vance, we concur with that, go ahead and align all three, do not reselect 1.

CAPCOM Challenger, Houston, after a comm drop.

SPACECRAFT Roger, we have you now.

CAPCOM Okay, Vance, did you copy you're go to align all three, but do not reselect number one?

SPACECRAFT Okay, and did you, if you observed that one, I don't guess you need the data, huh?

CAPCOM That's negative, Vance, we'd like you to go ahead and read us the data anyhow.

SPACECRAFT Okay, okay, stars 31 and 12, angular error .02. Delta X going across -.07, -.03, -.10. Delta Y, +.05, -.14, +.09. Delta Z, -.12, -.09, +.06. Torqued at 7 days, 5 hours, 52 minutes, and the reason you didn't see the item 16, or the alignment on the first attempt was that the alignment was performing with no astrisk after item 10, 11, and 12. They must have been taken away when we went to OPS 8 and back today. And we we're so use to having them there, we missed them.

CAPCOM Okay, Vance, copy all of that, we currently do not see anything wrong with IMU 1, however, we want to look at some
playback data before we reselect it. Did you see anything out of the ordinary to cause it to have dropped out?

SPACECRAFT No, the only thing out of the ordinary that I know of was an item 16 was performed without asterisk after 10, 11 and or 12.

CAPCOM Okay, copy that, we'll look at the data and give you a call later.

SPACECRAFT Okay, and going into COAS cal now.

CAPCOM Copy. Challenger, Houston, 6 and 1/2 minutes to LOS TDRS Guam at 06 + 26.

PAO Mission Control, Houston, 7 days 6 hours mission elapsed time. Challenger about to cross the equator on the northerly leg of its groundtrack, at the start of orbit number 117. Crew is about to do a crew optical alignment sighting operation. They just recently aligning the inertial measure units, using the stars in the star table. The did get an error message on IMU 1, it appears to be a procedural problem, and the flight controllers here in Mission Control will look at the data on that one and advise the crew. They do not see anything wrong with that IMU. Flight Director, Harold Draughon said he may put the crew to bed about an hour early today, so that will be about an hour from --

END OF TAPE
SPACECRAFT appears to have been a procedural problem and the flight controllers here in Mission Control will look at the data on that one and then advise the crew. They do not see anything wrong with that IMU. Flight Director Harold Draughon has said that he may put the crew to bed about an hour early today, so that would be about an hour from now. They are already in their scheduled presleep period and buttoning things down for the night, getting ready for tomorrow's entry. So we may be trying to put the crew to bed in about an hour from now. Things are otherwise very quiet here in Mission Control and we have about 4 minutes remaining in this pass through the tracking data relay satellite. Our next opportunity to communicate with the spacecraft will be over the Guam station, for a short pass, about 24 minutes from now. 7 days 6 hours 1 minute, this is Mission Control Houston. Mission Control standing by for acquisition through Guam.

CAPCOM Challenger, Houston, Guam for 4 minutes.

SPACECRAFT Roger, Houston, loud and clear.

CAPCOM And Vance, we got one switch for you, L1, we'd like H20 pump loop 1 to off, please. That's to make sure we don't get any alarms during the night on GPC cycles. We had an indication that maybe your high PPO2 alarm was partially at least caused by the cycling.

SPACECRAFT Okay, loop 1 water pump is off, and advise we've completed the star aline and then the COAS, you knew about the star aline but then the COAS cal, COAS cal went I think very well. The first one was a - mark was a fluck, so I took 7, the last 6 were fairly consistent, and I can give you the numbers if you'd like.

CAPCOM Okay, we'll take them.

SPACECRAFT Okay the first one was a fluck, was 1.20, the others were 0.20, 0.10, 0.10, 0.10, 0.10, 0.12.

CAPCOM Copy those, Vance. And we're going to get the dump of the data around the time of your IMU RM fail and hopefully we'll have an answer for you by early TDRS.

SPACECRAFT Oh, okay, very good. And advise I think I, that the 2 cals that were at 10.2 pressure were not an installation problem, it was a procedural problem. I was getting a, looking with both eyes and marking on a false image sometimes, 2 images look the same.

CAPCOM Okay, copy that, Vance, thank you.
CAPCOM    Challenger, Houston 30 seconds till LOS Guam, Hawaii at 06:39.
SPACECRAFT  Roger.
SPACECRAFT  Houston Challenger.
CAPCOM    Go ahead, Vance.
SPACECRAFT  When would you like the hotfire, now okay?
CAPCOM    We're going LOS here.
SPACECRAFT  Okay, understand you'd like to watch it, so we'll wait till the next.
CAPCOM    That's negative, I guess we don't have to see them real time, (garble).
SPACECRAFT  Okay.

END OF TAPE
CAPCOM: Challenger, Houston, Hawaii for about 2 1/2.

SPACECRAFT: Okay, Jerry, loud and clear.

CAPCOM: Hey, Jerry.

SPACECRAFT: Bob is Flash.

CAPCOM: Yes sir.

SPACECRAFT: Copy that.

CAPCOM: Just call me Buck McCandless.

SPACECRAFT: Right, thanks for the note you sent up, all the news and stuff.

CAPCOM: Yes sir, I thought you might need something to solve the cultural shock problem.

SPACECRAFT: Right. Appreciate the good words from our support (garble) too.

CAPCOM: Roger, that, I'll pass it on to that cast of thousands.

SPACECRAFT: Right.

CAPCOM: Challenger, Houston, going over the hill Hawaii, TDRS in about 8 minutes.

SPACECRAFT: Okay.

PAO: Mission Control Houston, 7 days 6 hours 41 minutes mission elapsed time.

SPACECRAFT: I was just joking when we were talking about Buck Rogers and Flash Gordon, but I think it's too late, probably the names have stuck.

CAPCOM: It is too late, you're correct, Vance.

PAO: Mission Control Houston, we're losing contact with the Challenger through the Hawaii station. Be picking up again in about 7 minutes through the tracking data relay satellite. Little note there, post script from Commander Brand, as he went over the hill from Hawaii indicating that his nicknames applied to McCandless and Stewart about Flash, being Flash Gordon and Buck Rogers, just intended in jest, but apparently he said the names have stuck, so they may be known as that around the astronaut office for a while. Things are very quiet here at Mission Control, all the system officers have pretty well squared
the Orbiter systems for the night. The crew officially according to the timeline have about an hour and 15 minutes remaining in their day before they are put to bed for the night, but Flight Director Harold Draughon has indicated that he would like to get them to bed an hour early, give them plenty of sleep before the entry tomorrow. No Orbiter system problems being worked at the present time. We did get an IMU fault indication earlier, when the crew was doing an alignment that appears to have been some sort procedural step that may have been left out there, and they are going to back and look at the data on that, but the don't believe, don't see anything wrong with that IMU. And this is Mission Control at 7 days 6 hours 49 minutse, we have acquisition through the tracking data relay satellite.

END OF TAPE
CAPCOM  Challenger, Houston, through TDRS.

SPACECRAFT  Roger, Houston, loud and clear.

CAPCOM  Okay, Vance, if you can give us a GNC spec 1 for some variable parameter changes, I got a couple notes for you and then hopefully we can sign off for the evening.

SPACECRAFT  Okay, GNC spec 1. Ready to copy.

CAPCOM  Okay, Vance, first of all you are go to reselect your IMU number 1, we've looked at the data and we think all the problems associated with doing the alignment without having IMU selected. Another item, state vector that you have on board now is good through rev 122, be about another 2 hours before we uplink to one that will carry you through the rest of the night. We watched the temperatures on your jets after your hotfire. They look good they will carry you through the evening. And you DAP and jet configurations looks good to us also.

SPACECRAFT  Okay, very good. (Garble) we select MUL.

CAPCOM  Roger that.

CAPCOM  Challenger, Houston, you got our spec 1 before we could get finished, we'll have to have one back.

SPACECRAFT  Okay, we'll give you spec 1.

CAPCOM  Challenger, Houston, we're done with the spec 1, we don't anticipate any further calls up to you, we'll be standing by for any messages that you want to give us. Have a good evening and see you tomorrow.

SPACECRAFT  Okay, I guess we don't have anything to send up to you, so righto, see you in the morning, thank you.

CAPCOM  Roger that, have a good night's sleep.

SPACECRAFT  Will.

PAO  This is Mission Control Houston, at 7 days 7 hours 7 minutes, mission elapsed time. We may have had the final communication with the crew for the night Fight Director Harold Draughon asked around the room if anybody had anything else, and nobody had any other things to relay up to the crew. Commander Vance Brand said he had nothing additional to talk with the ground about, so they said their goodnights, and we may not be hearing from them again, unless there is some item that comes up that requires their attention. We're actually putting them to bed almost an hour early tonight, to allow them plenty of time to
get good rest, before tomorrow's entry. Little earlier Vance Brand, made a comment about the nicknames that he had applied to the EVA crewman, Bob Stewart and Bruce McCandless, we ask for clarification as to which was which. He called one of them Flash the other Buck. It appears that he was refering to Bob Stewart as Flash and Bruce McCandless as Buck. Challenger is out over the continent of South America right now. Right about 60 degrees west longitude and at the bottom of the ground track, 28 and a half degrees south. Right about in the center of the southern third of the continent, and on the last quarter of orbit 118. And this is Mission Control at 7 days, 7 hours, 10 minutes, mission elapsed time. We have decided to cancel the next change of shift press conference, with off going Flight Director, Harold Draughon. We had all the entry figures and calculations and the necessary data for tomorrow's entry at the Gary Coen change of shift briefing several hours ago, and the only thing that has been going on here in the Control Center with the crew has been some cabin stowage items, powering down getaway special canisters, and simply getting ready for sleep, and preparing for tomorrow's entry. So we see no need to hold this next briefing, and have conducted a poll of the news organizations, we don't believe it is necessary to have one. So repeating the change of shift press conference with off-going Flight Director Harold Draughon, originally scheduled for 3:30 pm central time has been cancelled. This is Mission Control.

END OF TAPE
PAO and preparing for tomorrow's entry, so we so need to hold this next briefing, and have conducted a poll of the news organization, we don't think that it is necessary to have one. So repeating the change of shift press conference with off going Flight Director, Harold Draughon, originally scheduled for 3:30 pm central time has been cancelled. This is Mission Control.

PAO Mission Control Houston, 7 days 7 hours 16 minutes, mission elapsed time. Just to repeat our announcement of a few minutes ago, a change of shift press conference with off going Flight Director, Harold Draughon, originally scheduled for 3:30 pm central time, has been cancelled. The shift here has been very quiet, only cabin stowage and a few other activities have been going on since our last briefing this morning, and we have already made all the calculations and provided the numbers that apply to entry. So we have decided to cancel this change of shift press conference. This is Mission Control Houston.

PAO Mission Control Houston, the planning team has taken over from the orbit 2 team, and we would offer this reminder, we have changed and cancelled the Harold Draughon 3:30 pm change of shift press conference. The next press briefing will probably be postlanding unless we hold one tonight at the end of the planning shift. We'll let you know about that as we get into the evening. At mission elapsed time 7 days 7 hours 57 minutes, this is Mission Control Houston.

PAO Mission Control Houston, all quiet aboard the Challenger and here in Mission Control. The ground communications officer reports that on the next TDRS pass, on orbit 119, about 2 hours from now, there will be a test involving both the Landsat 4 spacecraft and Space Shuttle Challenger. Both will be transmitting through the tracking data relay satellite at the same time, which will be the first time that 2 orbiting spacecrafts have attempted that, to utilize the communication satellite that NASA has up there at the same time. And that will be coming the TDRS communication through - the Landsat communications through TDRS will be coming at mission elapsed time 7 days, I'm sorry, GMT 41 days, 23 hours, 10 minutes. And it will go until GMT 41 days, 23 hours, 25 minutes, or about a 15 minutes test transmission. At mission elapsed time 7 days 8 hours 14 minutes, this is Mission Control Houston.

PAO Mission Control Houston, we're AOS TDRS on rev 118, processing a little bit right data. A reminder we have cancelled the 3:30 pm press conference with Harold Draughon, at mission elapsed time 7 days 8 hours 26 minutes, this is Mission Control Houston.

END OF TAPE
PAO Mission Control Houston, Orbiter Challenger on orbit 119, 119 orbits of the earth. Thus far in Shuttle mission 41-B, currently in a 156- by 145- nautical mile orbit. Current altitude 152.8 nautical miles. A few numbers for you, if we do go for a nominal landing on KSC runway 15 tomorrow morning as is now planned, our touchdown time at this point would be 7 days 23 hours 16 minutes and 6 seconds. The TIG time, well the entry interface time, would be 7 days 22 hours 45 minutes and 9 seconds. And its present time its 7 days 9 hours 34 minutes and 35 minutes even. At mission elapsed time 7 days, 9 hours 35 minutes and 10 seconds, this is Mission Control Houston.
Mission Control Houston, all very quiet here in the Mission Control Center and aboard Orbiter Challenger, with about 4 hours and 10 minutes left in the crew's sleep period, prior to landing days activities. Right now the Orbiter is on rev 121, 121 over the South Pacific heading towards the coast of South America. Some updated landing time numbers, and these differ by only a few seconds from what you've heard before and what you'll probably hear again, but we'll go ahead anyway. Entry interface, according to the lastest numbers provided by FIDO, would be at 7 days 22 hours 45 minutes and 8 seconds, begin S-band blackout would be at 7 days 22 hours 47 minutes 45 seconds, end blackout would be at 7 days 23 hours 2 minutes 46 seconds, and touchdown would be at 7 days 23 hours 16 minutes and 8 seconds. We also have some entry view angles for a few cities along the southern periphery of the United States, and there aren't that many good sighting opportunities for the Orbiter during its passage into Kennedy Space Center runway 15 for a nominal landing tomorrow morning. But we'll give you a brief rundown. For the Houston area, there's a marginal chance of viewing the Orbiter and that's more local weather than anything else. The highest elevation that one would see the Orbiter at tomorrow morning if it were visible from the Johnson Space Center would be 23 degrees and an azimuth of 172.7 degrees or almost due south, and that would be darkness, Orbiter sunrise above so if there was anything visible it would be briefly at about 23.1 degrees. Other cities across the southern U.S., Dallas has a poor chance of seeing the Orbiter, San Antonio a fair chance, Laredo has a good chance, a few others, Galveston, Texas, has a good chance of sighting the Orbiter and we will provide these numbers to the news center as soon as this is generated and you can get more information on these there. But generally speaking, there aren't that many good opportunities around the country because the Orbiter is moving so fast and the time at which it might be sunlit from one's perspective point, from one's viewing point, with S-turns and clouds and that sort of thing, is not going to provide as good of viewing opportunity as one might see on a pass during an orbit. But we'll get those numbers to the news center. Right now we're at Mission Elapsed Time 7 days 11 hours 52 minutes and this is Mission Control Houston.

END OF TAPE
Mission elapsed time, 7 days, 11 hours, 52 minutes and this is Mission Control, Houston.

Mission Control, Houston, the Orbiter Challenger currently in orbit 156 by 145 nautical miles. We have about 3 hours and 20 minutes left in the crew's sleep shift. And there are some more refined landing time numbers and a proviso here, all of these numbers are going to keep on getting massaged through the night and will probably alter somewhat before we get down to landing. Right now what we show is entry interface at mission elapsed time, 7 days, 22 hours, 45 minutes, 9 seconds. And, again, this is for KSC runway 15 landing on orbit 128. Again, S-band blackout will occur at 7 days, 22 hours, 47 minutes, 47 seconds. End S-band blackout at 7 days, 23 hours, 2 minutes, 45 seconds and touchdown at 7 days, 23 hours, 16 minutes and 6 seconds. At mission elapsed time, 7 days, 12 hours, 41 minutes and 43 seconds, this is Mission Control, Houston.

Mission Control, Houston, currently on orbit 122 passing over the Australia continent. We've got some updated numbers for wave-off day landings for those of you who are following those sorts of numbers. Again our KSC landing time for Saturday morning on rev 128 is 7 days, 23 hours, 16 minutes and 8 seconds. For Edward's tomorrow morning, should we go into Edward's, that nominal first wave-off opportunity landing would occur at 8 days, 0 hours, 42 minutes, 35 seconds. Landings on Sunday, KSC would be 8 days, 23 hours, 9 minutes, 39 seconds and Edwards landing Sunday morning would be 9 days, 0 hours, 35 minutes, 44 seconds. Again, those are rough numbers. Those numbers will change and be updated throughout the night but that's the best and latest we can give you at this time. At mission elapsed time, 7 days, 12 hours, 53 minutes, this is Mission Control, Houston.

END OF TAPE
PAO -- at Mission Elapsed Time, 7 days, 12 hr, 53 min, this is Mission Control, Houston.

PAO Mission Control, Houston. We're at AOS TDRS on rev 122, processing S-band telemetry. Here in the Mission Control Center, some of the back room folks are reconfiguring the front room back lit monitor, the tracking map, and getting it set for the traditional postlanding display. After we've completed a mission, we usually pop up the crew patch and some other exotic manned flight operations type patches onto the front idafore and they're configuring that now. Otherwise, all very quiet here, as we await the start of the crew's final day in orbit in about 2-1/2 hr. At Mission Elapsed Time, 7 days, 13 hr, 13 min, this is Mission Control, Houston.

PAO Mission Control, Houston. About the biggest hard news of this quiet night before crew entry day is the fact that on the TDRS pass on orbit 121, a test was conducted we told you about earlier where both LANDSAT 4 and the Challenger were transmitting telemetry through the Tracking and Data Relay Satellite, the first time two spacecraft in orbit had done that. And the folks at Goddard Space Flight Center in Greenbelt, Maryland, and here in Mission Control report that test was successful, that both entities received good data from their respective vehicles. At Mission Elapsed Time, 7 days, 13 hr, 22 min, this is Mission Control, Houston.

PAO Mission Control, Houston. Challenger currently on orbit 123 over the Persian Gulf. This is an audio test, 1 2 3 4. Mission Control, Houston. The Orbiter Challenger now on orbit 123 over India. Got an update on a possible sighting of the Orbiter during its approach to the Kennedy Space Center tomorrow morning here from the Johnson Space Center. If weather permits, it will first be visible at 5:58 and 10 sec Central Standard Time. That's 5:58 Central Standard Time at an azimuth of 263 deg. It will be traveling at Mach 19.5 at that point. Its max elevation over the space center would be 23 deg at 6:00 o'clock and 50 sec Central Standard Time at an azimuth of --

END OF TAPE
PAO At Mach 19.5 at that point. The max elevation over the space center would be 23 degrees at 6:00 and 50 seconds, Central Standard Time at an azimuth of 175 degrees speed of Mach 16, altitude of 195,000 feet. We would lose sight of the Orbiter at 6:04 and 10 seconds, CST at an azimuth of 90 degrees. And during that time, passing over JSC, it would exit the S-band blackout. And that S-band blackout exit time is, CST, is 6:02:47. Those numbers will change somewhat and slightly between now and the actual approach but for the moment, they're very close. At mission elapsed time, 9 days, 3 hours, 34 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, all still very quiet here in Mission Control and also aboard the Challenger. With about 50 minutes left in the crew's sleep shift, we're on orbit 123 passing through the Bermuda tracking station site. Again, we're wondering about the necessity of holding the regularly scheduled 11:30 p.m. Change of Shift press conference with off-going Flight Director, Larry Bourgeois. Given the quiet nature of this shift, we rather doubt there's a need to hold that and we'd like to ask anyone who has opinions to the contrary to call the JSC newsroom or the KSC newsroom and we'll try to go ahead and cancel that in about a half an hour or so. At mission elapsed time, 7 days, 15 hours, 10 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, mission elapsed time, 7 days, 15 hours, 16 minutes. We would remind you that the upcoming Change of Shift press conference at 11:30 is your last chance to get some numbers and information from a real live flight director during Shuttle mission 41-B. And if you do have an interest in holding that, please let the JSC newsroom or the KSC newsroom know. This is Mission Control, Houston.

PAO Mission Control, Houston, Challenger on orbit 123 over north Africa. Again, we're wondering about the necessity of having an 11:30 p.m. Change of Shift press conference. We'd remind you that that's your last chance to get a shot at a flight director this flight. And if you do wish to have one, all members of the news media who would like to have one, please call the JSC newsroom or the KSC newsroom. If we don't hear anything, we'll probably cancel that about on the hour. Now mission elapsed time, 7 days, 15 hours, 30 minutes and this is Mission Control, Houston.

END OF TAPE
Mission Control, Houston, standing by for acquisition of signal through Yarragadee. About 5 min left in the crew's sleep period. We could get a wakeup call through Orroral, or failing that, that acquisition of signal through TDRS in about a half an hour. This is Mission Control, Houston at 7 days, 15 hr, 54 min. And CAPCOM reports we will get a wakeup call.

This is Mission Control, Houston. The change-of-shift briefing with Flight Director, Larry Bourgeois is cancelled. Challenger on orbit 123, presently we're AOS Orroral, the downlink data looks very good. The crew is awake at this time, but there'll be no initiative by the MOCR for a wakeup call until we acquire through TDRS in about 20 min. Mission Elapsed Time, 7 days, 16 hr, 5 min, this is Mission Control, Houston.

This is Mission Control, Houston at 7 days, 16 hr, 19 min Mission Elapsed Time. The data downlinked from Challenger over the Orroral pass indicated that two of the cathode ray tube displays on the flight deck DEU's, Digital Electronics Units, numbers 1 and 2 were activated, verifying that the crew's is up and awake and around inside the cabin. The wakeup call from CAPCOM John Blaha will occur at the TDRS pass when we go AOS TDRS in 4-1/2 min from now. At Mission Elapsed Time, 7 days, 16 hr, 20 min, this is Mission Control, Houston.

(Wakeup call)

Good morning, Challenger.

Good morning, Houston.

Good morning. We read you loud and clear with a little squeal.

This is Mission Control, Houston. That squealing was undoubtedly the (garble) speaker mikes that are configured in the overnight sleep shift, and frequently there's some feedback through them when they're try to use them for routine communication. Expect the crew will be configuring with their normal headsets. The wakeup call, incidentally, this morning was "In the Mood" by Contraband, a musical group composed of JSC employees. This is Mission Control, Houston at 7 days, 16 hr, 33 min.
PAO  The wake up call incidentally this morning was "In the Mood" by Contraband, a musical group composed of JSC employees. This is Mission Control, Houston at 7 days, 16 hours, 33 minutes.

CAPCOM  Challenger, Houston.

SPACECRAFT  Good morning, Guy, go ahead.

CAPCOM  Morning, Vance, you're go to maneuver back to solar inertial and we'd like you to read us the IMU align data. We don't need the angles errors but, I mean the torquing angles, but we need the rest of the information.

SPACECRAFT  Roger. Stand by one.

SPACECRAFT  Okay Guy, I have the IMU data request.

CAPCOM  Okay, Hooter, go ahead.

SPACECRAFT  Okay. Stars were 21, 17, angle error 0.02, execution time was 7 days/16:31:11.

CAPCOM  Roger, copy Hoot, thank you.

SPACECRAFT  Houston, Challenger.

CAPCOM  Roger, go ahead, Vance.

SPACECRAFT  Oh, good morning, John. Change of shift, huh?

CAPCOM  Roger that.

SPACECRAFT  John, I presume you'll be getting us a weather update here whenever you can. Be interested in dewpoint spread, too.

CAPCOM  Okay. We have a teleprinter message that will be coming up to you, Vance, which will highlight all of your entry summary activities for you.

SPACECRAFT  Okay, John, sounds great.

CAPCOM  And, Vance, if you have a second at your convenience, if you want to go over to the A-1 DAP.

SPACECRAFT  A-1 DAP. Roger, we'll check for A-1.

CAPCOM  Right, A-1, alpha 1 DAP.

SPACECRAFT  Okay, we'll check that.
CAPCOM        Challenger, Houston. I have 3 or 4 short little notes that I'll send up to you at your convenience.

SPACECRAFT   Okay, John, ready to copy.

CAPCOM        Okay, Hoot, for your CRT timer setup, it will be 22:16:00.

SPACECRAFT   Okay great, thanks, John. We copy a TIG of 22:16:00.

CAPCOM        Roger and as part of your entry switch list verification, we'd like you to perform the, prior to TIG, we would like you to perform the manual cabin atmosphere management orbit Ops checklist, page 5-10. Flow into only.

SPACECRAFT   Okay, prior to TIG, we'll do the manual cabin flowing into only entry prior to TIG.

CAPCOM        Roger. The third item I have, Hoot, is just a reminder to you to install the socket in the WCS door latch and secure it with gray tape as we talked about before you took off in order to prevent the door opening during entry.

SPACECRAFT   Okay great, thanks for the reminder, John.

CAPCOM        And one final item, the CAP and deorbit prep trajectory data are 4 minutes off. You will arrive at stars day night cycles and STDNs 4 minutes later than printed.

SPACECRAFT   Okay, copy. We hit everything 4 minutes later than printed.

CAPCOM        Roger and that is deorbit prep only, Vance, not the CAP.

SPACECRAFT   Okay great, thanks, John. Deorbit prep only.

CAPCOM        Roger.

CAPCOM        Challenger, Houston, we're 2 minutes to LOS, we'll see you at Yarragadee at 29.

SPACECRAFT   Okay Guy.

END OF TAPE
SPACECRAFT: Okay, great. Thanks, John. Deorbit prep only.

CAPCOM: Roger.

CAPCOM: Challenger, Houston. We're 2 min to LOS. We'll see you at Yarragadee at 29.

SPACECRAFT: Okay, Guy.

SPACECRAFT: Looks like another nice day on the west coast of Australia. We're looking right straight down on it, John.

CAPCOM: Roger that. Good to hear.

SPACECRAFT: (Garble) old stomping ground.

CAPCOM: Roger.

CAPCOM: Challenger, Houston. We have an entry weather message that'll take you through orbit 133 that's up on the teleprinter, and we will be getting the entry summary teleprinter message to you somewhere either over MILA or Dakar this pass.

SPACECRAFT: Okay. Great. Thanks, John. We're looking right down there on the teleprinter now.

CAPCOM: Challenger, Houston. We're going LOS 30 sec at Orroral. See you TDRS 18 plus 01.

SPACECRAFT: Okay, John. We'll see you there.

PAO: This is Mission Control, Houston. 7 days, 17 hr, 51 min Mission Elapsed Time. Entry team Flight Director Gary Coen just concluded a weather briefing at the -- latest weather reports at the landing sites. We have a go for the forecasted landing at Kennedy Space Center. Weather shows winds of 85 knots, westerly winds at 40,000 ft; at 20,000, winds from the southeast at 20 knots; at 10,000 ft, 10 to 15 knot winds. There's -- the forecasted winds are expected to mix the air rather well around the landing facility and that reduced the possibility of fog at that site. There are some isolated showers just offshore. There are no thunderstorms in that system. Maximum tops are at 9 to 10,000 ft. The weather people at Kennedy proposed to observe those storms all night. If they remain well offshore and, in fact, even if they do come within 30 miles of the Shuttle landing facility, we will continue to have a go for landing, but they will be watching those -- that weather formation. Northrup Strip is NO/GO for landing opportunities there today. Northrup has surface winds of 12 knots, gusting to 20. That's an 8 knot gust and we have a flight rule which prohibits landing in circumstances where gusts exceed 5 knots. Edwards is good for landing opportunities today. Scattered
clouds at 20,000 ft and light surface winds. So, at this point, weather looks good for a KSC landing as expected and as planned, and we'll continue to monitor those clouds and advise if anything unusual develops with them. We'll have acquisition through TDRS in 8 min at Mission Elapsed Time, 7 days, 17 hr, 53 min. This is Mission Control, Houston.

CAPCOM check.

NASA 901, Houston, on 2968, radio check.

Read you loud and clear, Guy.

CAPCOM

Roger, loud and clear now.

Okay, we're about a 100 miles west of Clute.

CAPCOM VHF.

Roger. Copy, and I'll be listening to you back on

Challenger, Houston is with you through TDRS.

CAPCOM

Hello, Houston. Loud and clear through TDRS.

CAPCOM

Roger. You're loud and clear, too.

And John, we were late getting the hi/lo SEP heater
turned on. We're delaying the radiator bypass FES checkout for
probably about another 15 min.

CAPCOM

Roger. Good thinking, Hoot. We agree.

John, that number that you figure those
temperatures (garble) be okay on the DUC said what, 98 to 140
right now, nozzle 78.

CAPCOM

Standby one. I'll see what EECOM thinks on that.

END OF TAPE
STST-41-B AIR/GROUND TRANSCRIPT t443j 042:07:06 2/11/84 PAGE 1

SPACExRAF

John, that number that you figure those temperatures (garble) be okay on the ducts at what, 98 to 140 right now, nozzle 78.

CAPCOM

Stand by one, I'll see what EECOM thinks on that.

SPACExRAF

Okay.

CAPCOM

Hoot, they look good to us and they're still coming up.

SPACExRAF

Okay, good deal. We'll get back to the rad bypass and FES checkout probably here within a couple of minutes then.

CAPCOM

Roger that.

CAPCOM

Challenger, Houston, a note on the heater ducts.

SPACExRAF

Go ahead.

CAPCOM

Roger, we recommend you go to heater duct A and B now and then use B for the FES checkout.

SPACExRAF

Okay, John.

CAPCOM

Challenger, Houston, we're seeing a little erratic activity with the PPO2 sensor alpha due to the FES checkout. You may get a message, no crew action required.

SPACExRAF

Okay, thanks John.

PAO

Mission Control, Houston. A FES checkout is check out of the Flash Evaporator System which provides cooling to vehicle systems after payload bay door closure. And the PPO2 valve is the system which provides the oxygen that's mixed with nitrogen for the cabin environment.

SPACExRAF

And Houston, the rad bypass FES checkout looked okay to us, how'd it look to you?

CAPCOM

We agree, Vance. Looks good.

SPACExRAF

Houston, Challenger.

CAPCOM

Roger, go ahead, Vance.

SPACExRAF

John, just want to report the Cinema 360 payload bay camera has been deactivated at 18 plus 25.

CAPCOM

Roger, thank you. And be advised. Challenger, we have our entry summary message coming up to you on the teleprinter at Dakar and our parting shot to you.
SPACECRAFT  Okay John, understand that after receipt of that message, we can take down the teleprinter.

CAPCOM  Roger that.

SPACECRAFT  Okay, you may fire when ready.

CAPCOM  Roger, it'll be in about 4 minutes at Dakar.

SPACECRAFT  That's an old navy term, John.

PAO  This is Mission Control, Houston. The Flight Director Gary Cohen is now polling the mission control team to get the GO/NO GO for payload door closure. This is the first decision point in the reentry process and the whole flight control team seems to be go for payload door closure. Door closing nominally would begin at mission elapsed time, 7 days, 19 hours, 10 minutes, roughly an hour from now. We still have 26 minutes remaining of TDRS coverage at mission elapsed time, 7 days, 18 hours, 29 minutes. This is Mission Control, Houston.

CAPCOM  Challenger, Houston, you are go for payload bay door close.

SPACECRAFT  Go for payload bay door closed.

CAPCOM  Roger that, Vance.

PAO  That call at 7 days, 18 hours, 30 minutes mission elapsed time.

CAPCOM  Challenger, Houston, we have the teleprinter messages up. Do you need a retransmit? We still have 4 minutes left at Dakar.

SPACECRAFT  Okay, Bruce will check it. John, the message is good.

CAPCOM  Roger, thank you very much.

SPACECRAFT  Bruce says, thanks for artwork.

CAPCOM  Yes sir.

END OF TAPE
SPACECRAFT    Houston, Challenger.
CAPCOM       Roger, go ahead.

SPACECRAFT    I noticed high wind at apogee, just wanted to confirm that. It must be due to high density, huh?
CAPCOM       Roger that, Vance.

SPACECRAFT    (garble) Challenger, Houston. (garble), this is Challenger.
CAPCOM       Roger, go ahead.

SPACECRAFT    Yes John, we'd like to close, open the sunshield a little bit early. Are we go for that?
CAPCOM       Roger, you're go for that, Bob.

SPACECRAFT    And we would also like to stow the Ku-band antenna right after the sunshields come closed if you're agreeable.

SPACECRAFT    Houston, Challenger, John, I didn't copy. Are we go for the sunshield opening?
CAPCOM       Roger, you are and stand by for the answer for Bruce.

CAPCOM       Challenger, Houston. Bruce, from INCO, you're go for that Ku antenna stow but give us a call right before you do it because we'll get an LOS and then have to reconfigure.

SPACECRAFT    Okay, we'll be ready in just a minute or so. Right after the sunshields come open.

CAPCOM       Understand, just give us a call, please.

PAO          This is Mission Control, Houston. Mission elapsed time 7 days, 18 hours, 47 minutes. It's, of course, necessary to open the sunshields on the Payload Assist Modules which embrace the 2 satellites since the payload bay doors won't close over the sunshields. So they've got to be retracted in order to facilitate door closing. Likewise, before you can close the door, of course, you have to stow that inboard Ku-band antenna which was the nature of Bruce McCandless' question. Payload bay door closure would nominally begin at 19 hours, 10 minutes which is roughly 20 minutes from right now. We are 3 and 1/2 hours away from deorbit burn, 3 hours and 56 minutes away from entry interface and 4 hours and 27 minutes away from touchdown at Kennedy Space Center, Florida. Presently, mission elapsed time, 7 days, 18 hours, 48 minutes, this is Mission Control, Houston.
SPACECRAFT Houston, this is Challenger, ready for Ku-band antenna stowing.

CAPCOM Roger that, Bruce. Bruce, we are go for Ku antenna stow.

PAO Data shows that the Westar sunshield on the Westar Payload Assist Module is open and that they've commenced procedures to open the sunshield on the PALAPA Payload Assist Module.

CAPCOM Challenger, Houston, we're sending a state vector for the vehicle up to you.

SPACECRAFT Roger Houston.

SPACECRAFT John, did you copy my last on Ku-band antenna stowing. The verniers are inoperative. Can we go ahead and stow it in PRCS with the current DAP or do we have to go to free drift for the stowing operation?

CAPCOM Roger Bruce, we'd like you to go ahead and go to free drift. Good call.

SPACECRAFT That means another --

CAPCOM Challenger, Houston. Roger, Bruce, we would like you to go to free drift for the stow.

SPACECRAFT Okay, John, we copy. Thank you.

CAPCOM Challenger, Houston, we're going LOS TDRS. See you at Yarragadee at 19 plus 04.

SPACECRAFT Okay John, see you there.

PAO This is Mission Control, Houston. Just before we went LOS at TDRS, the payloads officer affirmed that the sunshields on the Payload Assist Module that had contained PALAPA have opened and, of course, it's a unnecessary to open those sunshields before we can shut the payload bay doors. We're LOS presently. We'll acquire voice only through UHF station at Yarragadee in 9 and 1/2 minutes. Payload bay door closing will commence during that Yarragadee pass. However, there'll be no downlink data so we will have to rely upon the crew's --

END OF TAPE
PAO This is Mission Control, Houston. Just before we went LOS at TDRS, the payloads officer affirmed that the sunshields on the Payload Assist Module that had contained PALAPA have opened. And, of course, it's necessary to open those sunshields before we can shut the payload bay doors. We're LOS presently. We'll acquire voice only through the UHF station at Yarragadee in 9 and 1/2 minutes. Payload bay door closing will commence during that Yarragadee pass. However, there'll be no downlink data so we will have to rely upon the crew's voice verification that the door closure has at least begun. The closure should be complete by the Hawaii pass and we'll get some data there and be able to determine that the doors have closed. And certainly by TDRS AOS, we will have some high fidelity information about the nature of the door closure and whether the latch mechanisms have securely engaged. At mission elapsed time, 7 days, 18 hours, 56 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you at Yarragadee for 7 minutes.

SPACECRAFT Yes, we got you Houston, we're halfway through payload bay door closing here.

CAPCOM Roger that. Good show, Bruce.

PAO This is Mission Control, Houston. We have voice only through UHF at Yarragadee and no data so we're going to have to rely on the crew's commentary having to do with the payload bay door closure and whether we've got the good motors working and how the latch mechanisms operate.

PAO This is Mission Control, Houston, we're going to try to get some data through Orroral after we're LOS at Yarragadee. There's a very brief AOS period through Orroral for less than half a minute.

CAPCOM Roger, go ahead Vance.

SPACECRAFT Roger John, we're looking ahead to the IMU align verification, alignment and verification. Are you going to give us a PAD for that?

CAPCOM Vance, the data you have is good and we're going LOS here at Yarragadee in 40 seconds. See you at Hawaii for a one minute pass at 19 plus 33.

SPACECRAFT Yes, does that mean we do not need an alignment?

CAPCOM Negative, Vance, that means the attitude data you have for the align on FS1-3 in the deorbit prep is good.

SPACECRAFT Thank you.
PAO This is Mission Control, Houston. We've lost signal through Orroral and it's about 2 minutes here before, I'm sorry, lost signal through Yarragadee. And it's about 2 minutes before we pick up through Orroral and, again, it's a very brief pass and maximum elevation is 4 degrees, meaning that the line of sight between the earth station and the Orbiter will be just 4 degrees over the horizon at the highest point, which accounts for the brevity of this pass and certainly no assurance of the quality of the data or the voice we'll get. But we'll see if we can get some data take from it. And take a look at the downlink of payload bay door closure and see how that was going. Mission elapsed time, 7 days, 19 hours, 13 minutes, this is Mission Control, Houston.

PAO We're processing data from Orroral presently. The data shows that the Ku-band antenna is stowed and locked. Payload bay doors are closed and latched.

END OF TAPE
PAO (Garble) data from Orroral presently. The data shows that the Ku-band antenna is stowed and locked, the payload bay doors are closed and latched. This is Mission Control, Houston at 7 days, 19 hr, 16 min Mission Elapsed Time. We're LOS to Orroral now. Just got an update to verify a nominal closing of the payload bay doors and that the ship is securely buttoned up and ready for the deorbit burn with ignition just under 3 hr from now. Also, Cape weather advises that the thundershowers offshore there are beginning to disperse, which continued to enhance the likelihood of a nominal Kennedy landing this morning. We'll have acquisition again in 17 min through TDRS system. At Mission Elapsed Time, 7 days, 19 hr, 17 min, this is Mission Control, Houston.

PAO This is Mission Control, Houston. In a little more than a minute from now, we'll be AOS through Hawaii for a brief pass of less than a minute's duration and a very low elevation, 1.1 deg over the horizon, but we may get some voice and a little data from it. That AOS will be in just about a minute at Mission Elapsed Time, 7 days, 19 hr, 32 min. This is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through Hawaii for about 25, 30 sec.

SPACECRAFT Okay, John. We got just a little ahead on the IMU alignment, if you don't mind.

CAPCOM Looks good to us, Vance.

CAPCOM Challenger, Houston. We'll see you on TDRS in about 5 min.

SPACECRAFT Okay, John.

CAPCOM Challenger, Houston with you through TDRS.

SPACECRAFT Roger, Houston.

CAPCOM You're loud and clear.

CAPCOM Challenger, Houston. If you could give us a GNC SPEC 1, please, to uplink entry variable parameters.

SPACECRAFT Okay.

CAPCOM Thanks a lot.

SPACECRAFT You have that on CRT (garble)

END OF TAPE
CAPCOM    Roger, go ahead, Vance.

SPACECRAFT  John, would you like to take the IMU's align, (garble) verification?

CAPCOM    Vance, all we need is the star and the verification ang er.

SPACECRAFT  Yes, that's what I meant (garble) It was (garble) align as well as the (garble) right. Okay.

CAPCOM    Challenger, Houston with you UHF Goldstone, how do you read?

SPACECRAFT  Houston, Challenger, how do you read?

CAPCOM    Challenger, Houston is with you through Goldstone.

SPACECRAFT  Roger, John, loud and clear. How do you hear?

CAPCOM    Roger, Vance, loud and clear. We had very intermittent and broken comm for the past five minutes with you.

SPACECRAFT  Okay, well let me hold off on giving you the star aline data then, I'll give it to you when we have good comm.

CAPCOM    Roger, we have good, good comm right now Vance.

SPACECRAFT  Okay, star aline, ID 38 and 21; starting delta X row, minus .02, minus .03, minus .08; delta Y, minus .04, minus .04 plus .03; delta Z, minus .01, minus .00, minus .02. Execute time 7/19:35:00.

CAPCOM    Roger, thanks a lot Vance, we read the data.

SPACECRAFT  Angle error was .02 if you didn't...

CAPCOM    Okay, we copy the angle error.

SPACECRAFT  Okay, and verification, stars 19 and 49 angle error .01; delta X plus .04 minus .01 plus .03; delta Y, minus .01, plus .04, plus .01; delta Z, minus .02, minus .02, plus .06 and no execution.

CAPCOM    Roger, we copy that, thanks a lot for the data Vance and CRT is yours. CRT number 2.

SPACECRAFT  Roger. And Houston, we're standing by for any PADs.
CAPCOM   Vance, could you repeat your last please.

SPACECRAFT  Roger, John, we're just standing by for any PADs, deorbit type.

CAPCOM   Okay, I have them, when you're ready, the preliminary maneuver pad.

SPACECRAFT  Okay, we're ready to copy.

CAPCOM   Roger, OMS both TV roll 180 trim plus 0.2, minus 5.7 plus 5.7, weight 209 653, TIG 007/22:16:15.0, peg 4, 14...

END OF TAPE

SPACERCAFT Okay. OMS both, TV roll 180. Trims, plus 0.2, minus 5.7, plus 5.7. Weight, 209653. 007/22:16:15.0. Starting Cl 14801 minus 0.5947, 065.832, 120.580, all balls. Burn at 162330337. REI, 412926:05. Delta V TOT, 0316.302:49. V GO's, plus 0304.73, all balls, plus 085.00. HI, 149. HP, all balls.

CAPCOM Roger, Vance. A good readback, and I have your preliminary DEL PAD when you're ready to copy.

SPACERCAFT Okay. Ready to copy.


SPACERCAFT Okay, John. We've got a burn at 162330337. HA, 149 by all balls. 315.82:49. Propellant 06:00, 149086 —

END OF TAPE
SPACECRAFT Okay John, we've got a burn at 162330337, HA 149 by all balls, 315.82:49, repellant 06:001490868523237827, dump is NA, 1088.5 plus 1.4180192030, left 0, Guam at E1 minus 15, LOS E1 minus 12, altimeter is 30.1522:50:08 13,000, left overhead 302 degrees. KSC 15, 260 at 70, 250 at 85, 260 at 60, 280 at 20, 130 at 15, 120 at 6. Start APU 2, then 1; RCS PIC slip 3 minutes.

CAPCOM Roger that, that's a good readback. And the delta V tot, Hoot, we have a correction on that. It should be 316.3.

SPACECRAFT Okay, that's delta V tot to 316.3

CAPCOM Roger that.

SPACECRAFT The forward seat installation is is complete and we think the O2 and the HIU routing is complete, also.

CAPCOM Roger, copy.

SPACECRAFT Have not yet closed off the airlock.

CAPCOM Understand, thank you, Bruce.

CAPCOM Challenger, Houston, you are go for Ops 3.

PAO This is Mission Control, Houston. That call by CAPCOM John Blaha gives the Challenger crew approval from the Mission Control Center to configure the general purpose computers for entry. Data suggests that the vehicle is now assuming the burn attitude. We're just about 2 hours away from ignition on the deorbit burn and just slightly more than 3 hours away from the anticipated touchdown time at Kennedy Space Center. Mission elapsed time is 7 days, 20 hours, 8 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston, you are go for Ops 3.

SPACECRAFT Okay Houston, good.

CAPCOM Roger that, you are guys are looking --

CAPCOM Challenger, Houston, configure AOS.

SPACECRAFT Roger John, configure AOS.

SPACECRAFT (garble) from block 12.

CAPCOM Stand by one, Bruce. Challenger, Houston, Bruce, you are go for block 12.

CAPCOM Challenger, Houston, Bruce. You are go for block 12, deact star trackers and close the doors.
CAPCOM Challenger, Houston, Bruce. You are go for block 12, deact star trackers and close doors.

SPACECRAFT Roger, John. It'll be in work in just a second.

CAPCOM Roger that.

CAPCOM Challenger, Houston, we have one minute here left at Botswana. We'll see you next at Yarragadee at 20 plus 40. We're going to be in and out TDRS.

SPACECRAFT Yarragadee at 20 plus 40.

CAPCOM Roger that, Bruce.

PAO This is Mission Control, Houston, we'll get just intermittent data and probably no voice for the remainder of this TDRS pass and we'll acquire signal again through the UHF station at Yarragadee in about 12 minutes. During that pass, the OMS TIG, time of ignition, time was voiced up to the crew. TIG will be at 7 days, 22 hours, 16 minutes and 15 seconds. Producing a delta V of change of velocity of 316.032. Orbiter weight at TIG will be 209,653 pounds. Bruce McCandless advised --

END OF TAPE
PAO
-- 32. Orbiter weight at TIG will be 209,653 lb. Bruce McCandless advised that the seats had been installed, the middeck seats, and flight deck flight engineer's seats which are stowed during orbit, have been unstowed and installed in their positions on the ship. The FIDO here in the Mission Control Center has indicated that his data shows the crew is going to its dedicated display configuration, which makes available to the flight crew the instruments and displays which are of specialized interest to them during the entry and landing process. We'll have voice through Yarragadee in 10 min at Mission Elapsed Time, 7 days, 20 hr, 29 min. This is Mission Control, Houston.

CAPCOM
Challenger, Houston is with you at Yarragadee for 7-1/2 min.

CAPCOM
Challenger, Houston is with you at Yarragadee for 6-1/2 min.

SPACECRAFT
Okay Houston, loud and clear. How do you read us?

CAPCOM
You're loud and clear, Hooter, and you can configure LOS.

SPACECRAFT
Okay. Understand. Configure LOS.

CAPCOM
Roger.

CAPCOM
Challenger, Houston. We're going LOS Yarragadee in 35 sec. We see you next at Hawaii at 21 plus 05.

SPACECRAFT
Okay, John. Hawaii, 21 plus 05.

CAPCOM
Yes sir.

PAO
This is Mission Control, Houston. We're LOS through Yarragadee. Acquire next in 17 min through Hawaii. We're an hour and a half from deorbit ignition, and as a reminder, the Challenger will fly over the JSC area on its way to landing at Kennedy and will be visible from the ground. That visibility will be for a period of several minutes beginning at 5:58 a.m. Central Standard Time at an elevation of 23 deg over the southern horizon. The vehicle will be travelling about Mach 16 at an altitude of 195,000 ft, and, of course, they'll be moving from west to east. Again, deorbit ignition in 1 hr, 26 min. Visibility in the Houston area commencing at 5:58 a.m. Entry interface in an hour and 55 min, and the anticipated landing at Kennedy Space Center in 2 hr and 26 min. Mission Elapsed Time presently 7 days, 20 hr, 49 min. This is Mission Control, Houston.

CAPCOM
This is 946, Houston. Read you about 3 by 5, John.
Okay. Read you loud and clear. Over.

CAPCOM Roger. And I'll be going back and listening to you on VHF now. Thanks

END OF TAPE
CAPCOM          Challenger, Houston is with you through Hawaii for 7 min. Configure AOS.
SPACECRAFT      Roger, Houston. Configure AOS.
CAPCOM          And Vance, I'm ready to review the deorbit burn flight rules when you are.
SPACECRAFT      Okay. We were just starting to do that, so, very good. Very timely.
CAPCOM          Roger. We would like you to delete the first two columns.
SPACECRAFT      Copy.
CAPCOM          Down under the section of OMS, we would like you to delete the line ignition, neither engine ignites and both OMS engine fail, because we have RCS downmoding.
SPACECRAFT      Roger. Understand.
CAPCOM          And that's the end of the update for you.
SPACECRAFT      Gosh, that wasn't too hard, John.
CAPCOM          No sir. Good spacecraft.
CAPCOM          Challenger, Houston. Just a note for you, a reminder to perform the manual cabin atmosphere management, Orbit OPS checklist 5-10, into flow only.
SPACECRAFT      Roger, John.
CAPCOM          Challenger, Houston going LOS Hawaii in 30 sec. Configure LOS. See you at Goldstone in 5 min.
SPACECRAFT      Okay, John. Goldstone, 5 min.
CAPCOM          Challenger, Houston's with you at Goldstone for 5 min. Configure AOS.
SPACECRAFT      AOS.
CAPCOM          Challenger, Houston. We're going LOS in 30 sec. See you at MILA in 3 min. Configure LOS.
SPACECRAFT      Configure LOS, John.
CAPCOM          Challenger, Houston is with you through MILA for 8 min. Configure AOS. We are standing by for the gimbal check.
Okay, John. We'll be coming at you in about 20 sec.

Roger that. Thanks a lot, Vance.

Mission Control, Houston. The gimbal check to assure control of the orbital maneuvering system engines during the deorbit burn.

This is Mission Control, Houston. The landing condition winds at Kennedy Space Center have been dialed into the Shuttle mission simulator here in Houston, and Astronaut Ken Mattingly, the commander of the STS-4 mission, has been flying simulated entries in that machine to see if the Kennedy winds have any current expected affect on the programmed flight characteristics of the Orbiter. Findings of that function, if they are unique in any regard, will be uplinked to the crew as an advisory. Additionally, John Young, chief of the astronaut office, is flying Shuttle training aircraft at Kennedy, a modified Gulfstream which is configured to duplicate the aerodynamic characteristics of the Space Shuttle Orbiter. John Young will be flying that Gulfstream into the Shuttle landing facility at Kennedy to, again, measure the effects of the winds and weather conditions on the Orbiter at landing, and ...
... be to again measure the effects of the winds and weather conditions on the Orbiter landing and --

CAPCOM Challenger, Houston, the OMS gimbal check looks good from here.

SPACECRAFT Glad to hear it, John.

CAPCOM Roger that, good show.

PAO This is Mission Control, Houston. The data gained from the Shuttle Mission Simulator Tests and the Shuttle Training Aircraft approaches to Kennedy will constitute an advisory that's going to be made to the crew in advance of the landing at Kennedy Space Center. We're standing now, standing by now for a start of the auxillary power unit onboard Challenger. These are the units which provide hydraulic power to the aerodynamic surfaces. Mission elapsed time, 7 days, 21 hours, 29 minutes. We're 46 minutes away from deorbit ignition. Challenger's in a burn attitude now, essentially flying upside down and backwards. Backwards because the OMS burn is retrograde or in the direction of flight in order to reduce forward velocity. And the vehicle is flown upside down during this maneuver in order to provide the crew with horizon reference so that they can look out the panoramic front view of the Orbiter, see the earth's horizon and, although of course they have instruments, it's always of additional comfort to air crew to be able to look out the windows and see that the horizon is where the instruments say it's supposed to be. 45 minutes from deorbit ignition. An hour and 14 minutes from entry interface and an hour, 45 minutes from expected landing at Kennedy Space Center. At mission elapsed time, 7 days, 21 hours, 30 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston, we are tweaking the Orbiter state vector and standing by for the APU prestart.

SPACECRAFT Roger.

PAO This is Mission Control, Houston. That state vector being...

SPACECRAFT ...you'd probably like another item 22 then after tweaking the state vector, right?

CAPCOM I'll get back to you with an answer, Vance. Stand by one. Challenger, Houston, Vance. The vector is up and yes, good catch. We'd like another item 22.

SPACECRAFT Roger.

PAO Mission Control, Houston. The tweaking state
vectors is just a function to fine tune navigation aids onboard
the Orbiter to assure they have the most precise possible located
information in the Orbiter's navigation system.

CAPCOM Challenger, Houston, we're handing over from
Bermuda to TDRS, stay configured AOS.

SPACECRAFT Okay.

CAPCOM Challenger, Houston, we're with you again through
TDRS.

SPACECRAFT Houston, Challenger. Roger.

SPACECRAFT Houston, Challenger. APU prestart is complete with
3 great talkbacks showing in here. As soon as you're done
looking at those, I'll close them.

CAPCOM Roger, sounds good Hooter, and we concur.

CAPCOM Challenger, Houston, we're handing over from TDRS
to Dakar and Ascension. Stay configured AOS.

SPACECRAFT Roger John.

CAPCOM Challenger, Houston is with you through Dakar and
Ascension for 9 and 1/2 minutes.

SPACECRAFT Roger, John, and we're in OMS burn prep, page 3-3.

CAPCOM Roger, thanks, Vance.

PAO This is Mission Control, Houston. We're taking a
last hard look at Kennedy Space Center, their weather
constraints. Flight Director Gary Cohen said we're going to
press on ahead with plans to land at Kennedy Space Center.

END OF TAPE
Flight Director Gary Coen said we're going to press
on ahead with plans to land at Kennedy Space Center. It's
Mission Elapsed Time, 7 days 21 hours 45 minutes. John Young,
Chief of the Astronaut Office has been flying the shuttle
training aircraft into the shuttle landing facility and has
advised that the clouds and storm formations that were present
offshore earlier have dissipated. The only concern remains to be
patchy ground fog in the vicinity of the shuttle landing facility
moving east to west across the runway in patches. John Young
advises that he would land under these conditions. Weather
advises that the fog will probably not get thicker than it is
presently and that the sunrise at the Kennedy Space Center and
the increasing temperatures expected immediately before landing
would probably promote the dissipation of that fog. So based on
John Young's assessment, based on the weather assessment that the
fog will probably not worsen, Flight Director Gary Coen has
determined to press on for a Kennedy landing. Flight directors
are going around the room presently polling each of the flight
controllers to get a GO-NO/GO for deorbit burn and has uniformly
received go votes. We are 29 minutes away from deorbit ignition
and 1 hour 28 minutes away from expected touchdown at Kennedy
Space Center Florida. At Mission Elapsed Time 7 days 21 hours 47
minutes, this is Mission Control Houston. Flight director Gary
Coen instructed CAPCOM John Blaha to advise the crew of go for
deorbit burn. Mission Elapsed Time, 7 days 21 hours 48
minutes.

Challenger, Houston.

Roger, Houston.

Roger, you are go for the burn. New altimeter
setting of 3023. For your information, there's some slight
patchy ground fog, it will either stay the same or improve. John
Young has said he would land in the ground fog that is there now.

Okay, copy John and understand. You came in, I
think we lost the first part of your transmission but understand
go for the burn and understand the weather.

Roger that and an altimeter change to 30.23.

3023.

Challenger, Houston, we're handing over to TDRS,
see you there in a couple of minutes. Challenger, Houston, we're
back with you through TDRS for 13 minutes.

Roger, John, got you loud and clear though TDRS.

Mission.
947, Houston, radio check.
you're loud and clear, Guy.
MOCR also has given the go for the burn into the
Cape, P.J.

Okay, thank you.

PAO This is Mission Control Houston, the RMU systems
officer here has verified that all the vent doors onboard the
Orbiter have been closed in preparation for deorbit and entry.
Mission Elapsed Time, 7 days 21 hours 55 minutes, we are 21
minutes away from deorbit ignition.

CAPCOM Challenger, Houston, the hydraulic fluid thermal
conditioning is not required in the entry checklist page 3-32, at
EI minus 11. Challenger, Houston, the hydraulic fluid thermal
conditioning is not required at EI minus 11...

END OF TAPE
CAPCOM       -- 3-32 at EI minus 11.

CAPCOM        Challenger, Houston. The hydraulic fluid thermal conditioning is not required at EI minus 11, entry checklist, page 3-32.

SPACECRAFT    Roger. We understand.

PAO          This is Mission Control at Houston. Everything on control center data displays and the Orbiter Challenger continues to look good for nominal landing operations and deorbit burns. The deorbit burn will occur out of sight of the control center here. Ignition will occur in 14 min. The next acquisition will be through Yarragadee, but we don't have data through there, of course, we have voice only through UHF channels, so we'll have to rely on the crew's assessment and report of that burn. The Yarragadee pass will be 6 min in duration. Following Yarragadee, we acquire Guam on orbit 128 at Mission Elapsed Time, 7 days, 22 hr, 30 min. The Guam pass is very brief, only 3 min in duration, at a fairly low elevation of 3.4 deg over the horizon. Get a long pass to Hawaii beginning at Mission Elapsed Time, 7 days, 22 hr, 42 min. Acquisition for 4-1/2 min through the Hawaii station, then entry interface where the Orbiter encounters a sensible atmosphere, occurs at 7 days, 22 hr, 45 min. S-band blackout begins 7 days, 22 hr, 47 min. It will be about 15 min long, when, of course, we aren't able to acquire voice or data due to the ionization that builds up around the spacecraft as it accelerates through the atmosphere and is encompassed in a very thick plasma environment that prohibits radiation of telemetry or voice. The Orbiter, again, as a reminder, will be visible in the Houston area here at 5:58 a.m., at a maximum elevation of 23 deg over the southern horizon moving west to east. Orbiter will be at an altitude of 195,000 ft, traveling at Mach 16 during that period. We'll exit ...

CAPCOM        Challenger, Houston. We're going LOS TDRS in about 2 min. Configure LOS. We'll see you at Yarragadee at TIG.

SPACECRAFT    Roger. Yarragadee at TIG.

PAO          We'll exit S-band blackout at Mission Elapsed Time of 7 days, 22 hr, 47 min, and we should be acquiring data through the TDRS system at that point. The ground track of the Orbiter will bring it across Baha to the northern part of Mexico, right across the tip of the Big Bend National Park, past San Antonio, south of Houston, south of New Orleans, about 150 miles south of Mobile, Alabama, 175 miles south of Tallahassee, and will encounter the Florida peninsula just north of Tampa. Guidance navigation and control officer in the control center has verified that the Orbiter is in the deorbit burn attitude which is essentially flying backwards and upside down. Backwards because of retrograde burn where the OMS engines burn against the line of
flight, reducing the forward velocity so that gravity can begin to pull the Orbiter back to Earth. Flying upside down in order to give the flight crew a horizon reference and --

END OF TAPE
... the line of flight, reducing the forward velocity so that the gravity can begin to pull the Orbiter back to earth. Flying upside down in order to give the flight crew a horizon reference and the ability to visually verify the instrumentation readings. Deorbit ignition occurs in 9 minutes, 40 seconds. We'll get voice through Yarragadee at approximately that same time and look forward to the crew's assessment of the deorbit burn. We are 1 hour and 9 minutes away from expected touchdown at Kennedy Space Center, Florida. Mission elapsed time, 7 days, 22 hours, 7 minutes, this is Mission Control, Houston.

This is Mission Control, Houston at 7 days, 22 hours, 15 minutes mission elapsed time. We're a minute away from acquisition of signal through Yarragadee. The deorbit burn will occur about 10 seconds after AOS and again we don't have data capability through Yarragadee so we're going to have to rely on the crew's acknowledgment that the burn has occurred and that it is nominal. 30 seconds from AOS.

Challenger, Houston is with you at Yarragadee for 6 minutes.

Roger, we're just about ready to burn.

This is Mission Control, Houston now waiting for the commander's assessment of the burn.

Houston, Challenger.

Roger, go ahead.

(garble) nominal burn on time.

Sounds great, Vance, good show.

Mission Commander Vance Brand reporting a nominal deorbit burn. Landing at Kennedy Space Center in Florida will occur in 55 minutes. We have another minute and a half remaining through this pass at Yarragadee. We'll go out of range of that station, pick up either from Guam in about 10 minutes and we'll have some velocity altitude and sync rate information that will advise us of how the Challenger's doing relative to nominal expectations. At mission elapsed time, 7 days, 22 hours, 21 minutes, this is Mission --

Challenger, Houston going LOS Yarragadee in 50 seconds. See you at Guam in 7 and 1/2 minutes.

Roger John.

NASA 947, CAPCOM.
Yes, Guy. Did they get the burn off?

CAPCOM Yes, they got the burn off, P. J., and they're heading into the Cape.

Okay.

CAPCOM We'll talk to you later, we'll go ahead and take this loop down.

Rog.

PAO Mission Control, Houston. We're about a minute away from acquisition of signal through Guam. Weather at the Cape advises that there's still some patchy ground fog at that location, but nothing that's going to be problematic. It -- fog has kind of retreated to an area of 50 feet and below and the weather forecast suggests that it should be transparent by the time the Orbiter arrives there and should not in any way seriously obscure their view of the runway. The Guam pass will give us data and we'll be able to assess the Orbiter's rate of descent. Of course, the burn doesn't have a very profound effect on a velocity, altitude or sync rate this early on. But by the time we get to Hawaii, we should have some very noticeable measurements to report. The Guam pass is very low elevation, only 3.4 degrees maximum elevation over the horizon. So that may affect the quality of the data and of voice.

CAPCOM Challenger, Houston is with you at --
But by the time we get to Hawaii we should have some very noticeable measurements to report. The Guam pass is very low elevation, only 3.4 degrees maximum elevation over the horizon, so that may affect the quality of the data and the voice.

Challenger, Houston is with you at Guam for 3 minutes.

Roger, Houston loud and clear.

Roger, you are too, configure AOS.

We will remain configured AOS through landing.

Okay.

RMU systems officer reports that the auxiliary power units are running very well. Data shows the vehicle to be in very good condition, no anomalies. About 2 minutes remaining in this pass.

Challenger, Houston, we're going LOS Guam 30 seconds, we'll see you at Hawaii at EI-3.

This is Mission Control Houston at 7 days 22 hours 23 minutes, 33 minutes, Mission Elapsed Time. Data take over Guam during that pass, the Guidance Navigation and Control officer affirmed to the flight director that the ship's configuration looks good and all systems appear in order for entry and landing. Guidance officer reported that the onboard vectors compared well with the nominal and the flight dynamics officer reported that the delta V's, the changes in velocity, were at the expected levels. We will acquire signal again through Hawaii in 7 minutes 54 seconds. Entry interface occurs at 10 minutes 48 seconds from now and we're roughly 41 minutes from touchdown in Hawaii. Our NASA Select video shows sunrise at the Kennedy Space Center, the runway lights, and weather thinks that the sunrise and resulting increasing temperatures are going to promote dissipation of that ground fog that the chief of the astronaut office, John Young, reported early. The ground fog stays within 50 feet of the ground and is expected to be transparent to the crew as they arrive. We are 40 minutes away from expected landing at Kennedy Space Center. There will be the blackout period as we go through the period of ionization buildup. The blackout will begin at, in terms of mission elapsed time, 7 days 22 hours 47 minutes and we'll exit blackout 15 minutes later. Next contact with the ship will be at the ground
station at Hawaii in 6 minutes and the Hawaii pass is 4 minutes in duration. Mission elapsed time, 7 days 22 hours 36 minutes, this is Mission Control Houston.

PAO This is Mission Control Houston. We're approximately a half a minute away from acquisition through Hawaii. That will be the last contact with the ship before the blackout period, the Hawaii pass will be about 5 minutes in duration. And we're processing Hawaii data.

CAPCOM Challenger, Houston is with you at Hawaii for 4 minutes.

SPACECRAFT Roger, Houston and we are proceeding with no problems at all, everything's going very well.

CAPCOM Roger, that, good show, Vance.

PAO Mission Control Houston. The flight director has polled members of the flight control teams and all have reported nominal systems operations, vehicle velocity is reduced to 20, Mach 24 and, there's a sync rate shown of approximately 500 feet per second.

END OF TAPE
15 for its final approach. During its flight across Florida, Challenger will be at a very high altitude, above 90,000 feet as it passes over the west coast, drop to about 84,000 feet by the time it's parallel with Orlando. And still be above 40,000 feet as it passes the end of the shuttle runway for the first time, although the speed will have dropped to less than the speed of sound at that point. Approximately 5 minutes and 26 miles remain at that point. And during it's turn to the right over the Atlantic Ocean, or turn to the left over the Atlantic Ocean, it will drop to an altitude of 10,000 feet. At this point, it'll be 7 miles from the end of the runway and on a final approach of a 22 to 24 degree approach which dissipates the remaining energy with a preflair and flair maneuver. It takes only about a minute to come down the glide slope from above 9,000 feet to flair. Then the landing gear will be dropped when it's just 200 feet above the runway. Although weather forecasting is becoming a more and more exact science, forecasters still have trouble with small areas and to help ensure the proper visibility is available, two T-38 aircraft in the Shuttle Training Aircraft have been aloft several times to see what's happening across Florida in general and in the vicinity of Kennedy Space Center, in particular. Astronaut John Young who is the head of the astronaut office and has been the commander on STS-1 and 9, was the one who made a final determination that the landing strip was ready for the land —

END OF TAPE
PAO ... velocity is reduced to 20, Mach 24. There's a sink rate shown of approximately 500 feet per second. This is Mission Control, Houston. Speed, temperature, pressures on all 3 auxiliary power units are within nominal constraints. This is Mission Control, Houston. Orbiter at 396,000 feet, altitude sink rate of 488 feet per second. Range shows 4000 miles to runway 15 at Kennedy Space Center.

PAO This is Mission Control, Houston, data continues to show nominal function.

PAO This is Mission Control, Houston. We've had S-band blackout and will acquire signal again in just over 14 minutes.

KSC This is the Shuttle Landing Facility at the Kennedy Space Center. All elements of the landing team are ready and standing by for the first landing at the Kennedy Space Center. Actually, preparations have been underway at KSC since before the first Shuttle flight back in April of 1981. The Shuttle Landing Facility has been ready for all of the contingency landings on each mission and has practiced hundreds of times for the landing which is now minutes away. Many of the people involved have participated in landing and ferry operations in California as well. At about an hour before the landing, the convoy commander, Bill Williams, moved the forward elements of the convoy, called the mini-convoy, down to the south end of the runway so that they can approach the vehicle from the nose. At the present time, the helicopters, department of defense helicopters, are coming in. They stand by in case of any contingency where they would have to help rescue the astronauts if the vehicle should go off of the runway. The remainder of the convoy is at the midpoint of the runway and will immediately follow the Orbiter as it passes by during the landing. It will then pause at a point about 1,000 foot away from the Orbiter. As soon as the wheels stop after landing, the mini-convoy will move out to a position a few hundred feet from the nose of the Orbiter. Ordinarily, they would be a little closer than today, but we have heard there's just a slight tail wind of about 2 knots. At that point, a safety inspection team will begin immediately to look at the front end of the Orbiter using a sniffer which automatically analyzes the air for any traces of toxic chemicals. Once an all clear is given, the stair truck moves into position at the hatch and the astrovan, which is now in place with that convoy, will take up its position to take the flight crew back to the crew quarters. The shuttle Orbiter, Challenger, will be cutting almost directly across the center of Florida. It'll cross the west coast at a point near Bayport and follow a general s-curve over Brooksville, swing gently to the northeast over Webster and Centerhill and then will pass over Lake Mary across the St. John's River Valley to a point just north of Mims. It'll soar over the Indian River and north of the Shuttle Landing Facility, making a left turn over the Atlantic Ocean to line up with runway
-- forecasters still have trouble with small areas, and to help insure that proper visibility is available, two T-38 aircraft and the Shuttle Training Aircraft have been aloft several times to see what's happening across Florida in general, and in the vicinity of Kennedy Space Center, in particular. Astronaut John Young, who is the head of the Astronaut Office and has been the commander on STS-1 and 9, was the one who made a final determination that the landing strip was ready for the landing here at the Kennedy Space Center. Here at the Kennedy Space Center, everything in readiness. The convoy's in position, including a red carpet for the first landing of the space Shuttle returning from space. This is the Shuttle landing facility at Kennedy Space Center.

PAO This is Mission Control, Houston. There was some concern that we might be able to penetrate S-band blackout with the TDRS system, and we've had no success in that endeavor and we are still in the blind and awaiting the termination of S-band blackout. This is Mission Control, Houston. NASA Select video being shown from a T-38 chase plane at Kennedy Space Center being piloted by Charlie Justice of Houston's aircraft operations. We're still 5 min away from the predicted end of S-band blackout. The patchy fog that was earlier reported at the Shuttle landing facility has essentially been reduced into intermittent whips, and is almost completely transparent, no problem seeing through it at all. There will be three roll reversals performed by the Orbiter to reduce velocity. The roll reversals are performed as a factor of velocity when velocity reaches 12,960 ft per sec at an altitude of 179,000 ft. There's a right roll reversal performed at 139,000 ft, a left reversal, and a final roll reversal and right reversal at 97,000 ft. Those are all done in the automatic mode. The Orbiter will come in under auto pilot all the way until it encounters the heading alignment cone at Kennedy Space Center, at which time Mission Commander Vance Brand will take manual control of the ship. About 3 min remaining until the predicted end of the S-band blackout and we will resume communications. Mission Elapsed Time now is 7 days, 23 hr even. About 2-1/2 min remaining until we reestablish voice with the crew. This is Mission Control, Houston. According to predicted digitals, the Orbiter should have crossed -- come across Texas by now and just be encountering the Gulf of Mexico. And again, according to predictions of travel, the vehicle should be traveling at a speed of about Mach 16 at 195,000 ft. And we have Acquisition of Signal data now coming into the control center. We should have voice momentarily. And vehicle's traveling at Mach 14. No communications yet due to the inability of a good strong forward link through the TDRS system. They are getting data. Velocity is Mach 13.7, altitude is 216,000 ft, sink rate has not been updated by the computer yet. Challenger now about 80 miles south of New Orleans traveling across the Gulf of Mexico. Velocity at 12.4 Mach.

END OF TAPE
(garble) computer yet.

PAO       Challenger now about 80 miles south of New Orleans traveling across the Gulf of Mexico. Velocity, 12.4 Mach, 600 miles from Kennedy Space Center. Ground track shows about 140 miles south of Biloxi, Mississippi.

CAPCOM    Challenger, Houston is with you at MILA.

SPACECRAFT Roger, Houston, and we're passing Mach 11. Doing great. Beautiful show.

CAPCOM    Roger that, and be advised that current Cape weather is clear and 30 miles visibility.

SPACECRAFT Super. Hey, thank John for getting us that kind of weather. John Young.

CAPCOM    Roger that.

PAO       The initial roll reversal has been completed. Now below Mach 10, Mach 9.7. Sink rate, 170 ft per sec. Challenger about 500 miles from Kennedy Space Center, crossing the Gulf now approximately 140 miles south of Mobile, Alabama. Velocity now below Mach 9, Mach 8.5. Altitude, 150,000 ft. Sink rate is about 300 ft per sec. Challenger now about 200 miles off the coast of Florida. Vehicle about 175 miles south of Tallahassee.

SPACECRAFT Houston, TACANS look good from our side.

CAPCOM    Roger. We're looking at the data. Standby one, Vance.

SPACECRAFT Roger.

PAO       TACANS, or tactical air to aid to navigation. A sink rate of 200 ft per sec. Mach 6.3.

CAPCOM    Challenger, Houston. We're not locked up on the track, your call on the TACANS.

SPACECRAFT Okay. We'll take them.

PAO       Altitude 133,000 ft. Velocity, Mach 5.9. Spaceship now approximately 50 miles from the coast of Florida travelling at Mach 5.4. Sink rate of 316 ft per sec.

CAPCOM    Challenger, Houston. Transfer state vector to backup, your convenience.

SPACECRAFT Okay. Thank you. We'll do that.
PAO The Orbiter now visible on NASA Select. Just encountering the Florida coastline, crossing the coast roughly at New Port Richey. Altitude 110,000 ft. Velocity, Mach 4.3.

CAPCOM Challenger, Houston. Emerging ground track and nav are go.

SPACECRAFT Excellent, John. Thank you.

PAO Vehicle in the automatic flight mode still. Mach 4 velocity. Altitude 103,000 ft, and the final roll reversal, extreme right turn to further reduce velocity is being performed by the ship. And that roll reversal very clearly visible on NASA Select. Inertial velocity now 3. --

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STSB-41B AIR/GROUND TRANSCRIPT 042:12:08 2/11/84 PAGE 1

PAO And that roll reversible very clearly visible on NASA Select. Inertial -- velocity now 3.1 Mach. Range 74 miles from the runway.

CAPCOM ... take air data.

SPACECRAFT Roger, take air data.

PAO Altitude 87,000 feet, sink rate of 270 feet per second. Our range, 63 miles. Challenger now just east of Orlando a range of 52 miles from the Shuttle Landing Facility. Altitude, 76,000 feet. Velocity, Mach 2. The range 46 miles, altitude 74,000 feet, sink rate -- still losing altitude at the rate of about 200 feet per second. This picture being provided by the long range tracker at Cape Canveral Air Force Station.

SPACECRAFT (garble) on the change at 77.

PAO Velocity 1.4, 33 miles from runway 15.

SPACECRAFT (garble)

PAO Velocity Mach 1.2, altitude 56,000 feet, range 29 miles. Flight Dynamics Officer reports the energy level in the Orbiter is perfect. Velocity is now subsonic at Mach .9. 25 miles from the runway, altitude 47,000 feet. There's the final turn into the HAC. Still in the automatic flight control mode and should be shortly transferring to manual control. Pitch and roll functions now in manual control. Vance Brand now flying the ship.

(garble) on your left.

SPACECRAFT Roger, thanks.

PAO Air speed 256 knots. Speed brakes deployed. Altitude 30,000 feet, range 16 miles to the end of the runway, a sink rate about 250 feet per second. The hydraulic landing gear valves are open. APU performance still nominal. All APUs running at roughly 106% speed. This photo from the chase plane, T-38, piloted by Charles Justice of Houston Aircraft Operations. A sink rate now less than 200 feet per second. Flight control in the automatic mode. 11 miles range, 10 miles from the end of the runway, airspeed 256 knots, altitude 17,000 feet. .15 g's on the heading alignment cone. Performing a left turn into the runway. Altitude 12,000 feet, 7 miles from the runway.

CAPCOM Challenger, Houston, you look good rolling out on final. Calm surface winds.

PAO Airspeed 84 knots, 284 knots --
...turn into the runway. Altitude 12,000 feet, 7 miles from the runway.

Challenger, Houston, you look good rolling out on final, calm surface winds.

Roger.

Airspeed 184 knots, 284 knots. Challenger, now visible at Cape -- at the Kennedy Space Center, 6000 feet altitude, 4 miles range, sink rate 170 feet per second, velocity 284 knots. Energy levels still nominal, altitude 1000 feet, 1 mile from the end of the runway. Gear down and touchdown for Space shuttle's first Florida landing, unofficially mission elapsed time, 7 days 23 hours, nose gear down, touchdown at 190 knots. Flight controller reports steady braking, and wheels stop, unofficially mission elapsed time of 7 days 23 hours 17 minutes.

Okay, Houston, wheels are stopped.

Roger that, Challenger, welcome home, fantastic job, stand by for postlanding deltas.

Okay.

And Challenger, Houston, post landing delta's. Delete the hydraulic load test and if we get any extended power up, I'll have a few more for you then.

Okay, we copy, delete the hydraulic load test.

Rog.

This is Kennedy Space Center. Thousands of people here cheering, and welcoming back the space shuttle orbiter Challenger, out on the runway the mini-convoy on its way towards the nose of the vehicle. The convoy from the midpoint coming up near the -- toward the end of the -- towards the rear of the vehicle. The convoy is made up of a number of specialized vehicles, the mini-convoy coming toward the nose has the convoy commander's vehicle, which is modified to provide command and communications capability with the control room, mission control in Houston and the Orbiter. Four consoles are installed and are manned by the commander, his backup, the purge cooling test director and the Department of defense on-scene commander. Some of the more recognizable vehicles in the convoy are the escape van for the technitians who do the initial checkout of the Orbiter, wearing self contained atmospheric breathing apparatus. A vapor dispersal unit is a mobil wind machine on a trailer modified from the standard agricultural wind machine and that would be used to blow any toxic propellant vapors away from
the Orbiter. We have a very, very calm day here at the Kennedy Space Center and it looks like the -- there's going to be no problems, the emergency equipment coming up now, the people from the escape van getting out to begin their check with the sniffers which analyze the air around the Orbiter to ensure that there are no toxic fumes which are being released by the Orbiter. The two largest trucks in the convoy to the rear of the Orbiter have long brooms with trailing lines which makes them look a little bit like friendly dinosaurs. The one is a tractor trailer carrying a refrigeration unit that provides freon to the Orbiter's cooling system to cool the electronic components. The other is a tractor trailer carrying an air conditioning unit to provide cool humidified air to the payload bay and the fuselage cavities to remove any residual hazardous fumes. And also very important to the crew is the access vehicle carrying stairs similar to those used for aircraft, this one has a small...

END OF TAPE
... provide cool, humidified air to the payload bay and the fuselage cavities to remove any residual hazardous fumes. And also, very important to the crew is the access vehicle carrying stairs similar to those used for aircraft. This one has a small white room at the top to maintain clean conditions in the Orbiter. The Orbiter is going to be on the runway for approximately 8 hours. Right now the camera focusing in on the exhaust from the auxiliary power unit, which will be powered down approximately 15 minutes after landing. Meanwhile, the crew is going through their postflight operations.

This is Mission Control, Houston. All the energy levels and vehicle performance throughout the landing mode were completely nominal. The ship won't be moved until the brakes are examined and they're pulled for shipment back to the manufacturer. The exhaust fumes visible from the aft end of the ship are nominal from the auxiliary power units which are still running at speed. Inside Challenger, the crew is throwing switches and going through a postflight configuration to safe the vehicle in preparation for egress. Propulsion systems officer in the control center verifies that the propulsion systems have been secured.

Mission Control now preparing to give the flight crew a go for reconfiguration of the data processing system onboard the ship.

And Houston, if we need any (garble) activation, we presume you'll give us a call.

Roger Wilco, Vance, and you're go for the DPS transition.

This is Kennedy Space Center. Out on the runway, the escape suited crew people have been surveying the nose of the Orbiter to determine whether or not there was any toxic propellants. They have been holding their probes up towards the reaction control system which is used for maneuvering the Orbiter in space, and would be one of the most likely places to have any fumes coming up. They are also now checking around the rear of the Orbiter. Everything appears to be going very well as far as the function of the APU's, those Auxiliary Power Units, which are powered by turbines, and which had a problem on the last mission right at the time of landing. As soon as the crewmen with the (garble) have completed their work, they will go ahead for the truck carrying the stairway to move in. It has a white room attached to it, and the crew then will be able to proceed with getting ready to open the door in the Orbiter, and have an
exchange of the crew with the support crew. Their support crew astronauts today are Shannon Lucid and Mike Smith, and they'll take the flight crew's place in the Orbiter to complete procedures and to help move the Challenger to the OPF. One of the first people who will go into the Orbiter once they are allowed to move closer will be the flight surgeon who will check over the crew and make sure that they're ready to leave. The crew generally will leave the Orbiter somewhere between 40 and 50 min after the landing. The escape suit personnel can detect concentrations of any toxic propellants down to just a few parts per million, and are an essential ingredient in the operations ....

END OF TAPE
PAO ... of any toxic propellants down to just a few parts per million and are an essential ingredient in the operation, to just ensure that there is no danger for any of the other people in the landing crew as they approach the vehicle. The convoy commander stays in constant touch with them as they move around the Orbiter, checking each area. Often, they are a little more worried about having a very very calm wind such as we do today because the, any vapors would not be blowing away as they normally do. As soon as the crew closes down the gas turbines which are part of the auxiliary power units, then the rest of the convoy will be able to be moved in position, although the APU shutdown comes at approximately 15 minutes after landing or just a few minutes from now. The first truck which will approach the rear will be the freon truck which is connected first and that's followed by the purge truck which flows air conditioned air through the cargo bay. The hatch will be opened at about 22 minutes after the landing. Appears that the technicians in the rear of the Orbiter are moving off, they've been checking the area back there and we have the convoy commander moving forward. A GO has been given that it's safe to be moving closer to the vehicle. Just a few minutes from now, right now the stair truck moving up to the Orbiter and then the backup astronauts, the flight surgeon and the technicians will be able to get busy with getting the door open and getting in and checking the crew members. Everything going smoothly with the return of the Orbiter here at the Kennedy Space Center.

CAPCOM ... okay Vance, under GPC 234 power down, we'd like to leave GPC 2 up. And so, just that you can scratch out the GPC 2 reference there. When you do the restringing, we still want you to restring them all to GPC 1, GPC 2 will just go to OPS 0 and we just want to leave up and when you turn one CRT off, we would like to make sure that is not CRT 2. What we're doing is looking at GPC 2 and CRT 2, so we'd like to leave both those on.

SPACECRAFT Okay and would you like me to, then I will plug it all but GPC 1 but I'll leave 2 on per your instruction.

CAPCOM That's affirmative, Vance.

PAO This is Mission Control Houston, the Capsule Communicator talking to Mission Commander Vance Brand with instructions to leave general purpose computer #2 powered up.

CAPCOM And Challenger, Houston, Vance, we're ready for the ammonia boiler, like ammonia boiler number bravo to primary GPC.

SPACECRAFT Affirmative GPC. And Gary, we're under APU hydraulic shutdown, you ready for us to proceed?

CAPCOM Roger, you're, go ahead Hoot.
PAO  The crew now preparing to shut down the 3 auxilliary power units that use hydrazine fuel to provide, to control the aerodynamic surfaces in the vehicle. We show the speeds now down to 0. And hydraulic pressures are dropping accordingly. And APU shutdown is proceeding nominally.

SPACECRAFT  And Houston, we've got APU hydraulic shutdown complete.

CAPCOM  Roger, Houston copy.

PAO  That's Mission Commander Vance Brand visible through the flight deck windows in the Orbiter. He has his launch/entry helmet in place.

END OF TAPE
SPACECRAFT: hydraulic shutdown complete.

CAPCOM: Roger, Houston copy.

PAO: That is Mission Commander, Vance Brand, visible through the flightdeck windows in the Orbiter. Still had his launch/entry helmet in place. There's OMS pod showing minor scorching from the heat of reentry. This is Mission Control, Houston. The general purpose computers have been shut down except for GPC number 2, which the flight control team has asked to be left activated. The Convoy Team has moved forward preparing for crew egress, and the crew should be leaving the ship in another 5 or 10 min.

CAPCOM: Challenger, Houston. You can ignore the fail to sync on GPC and continue on.

SPACECRAFT: Roger.

SPACECRAFT: Houston, Challenger. We're starting to unplug here, so we'll be off the comm now.

CAPCOM: Roger. Copy.

PAO: This is Mission Control, Houston. That was Challenger, Pilot Hoot Gibson indicating that the crew is preparing the egress from their seats, and should leave the ship shortly.

PAO: This is Mission Control, Houston. The propulsion's systems officer here in the control center has affirmed that the pressures and temperatures in the forward reaction control system are all at normal levels, and there's no evidences of leaks from those systems, and they had done their problematic during the flight, and of course, accordingly, took extra attention during the checkout process here, but they have been verified as of healthy and not leaking propellants, or fumes.

This is (garble) Kennedy Space Center. The change-out-crew, getting ready to go up the steps, they've been up to the bottom of the steps, and now back at the van. The TV camera's taking a look at all of the important areas of the Orbiter just after landing. One of the reasons for that is, that the, directors here in the firing room, and the technicians who have to work on the Orbiter are anxious to know what kind of shape it's in. The first consideration, of course, is the safety and then they want to get a look at it, because the turn around time between flights is getting shorter and shorter as we get into this year. The next flight of the Challenger is scheduled tentatively for the first week in April. The team from the cooling trucks up on their walkway now attaching the freon lines to the aft of the Orbiter. This is a cooling system which is
used to keep the electronics in the Orbiter cool just after landing. The Orbiter kept powered up, so that may of those systems are operating. Just in front of the wing of the Orbiter is the astrovan which will be used to transport the crew back to the crew quarters. People in readiness, photographers for the crew (garble) from the Orbiter. The hatch is open now on the Orbiter. Just 25 min after landing, the crew is expected to be getting out somewhere around 40 min after landing, or about 15 min from now. People in the firing room, or the control room at the Kennedy Space Center, the members of the landing team all very happy about the way that the first landing here at the Kennedy Space Center has been going.

END OF TAPE
KSC The crew walking up to the steps now to go up to the hatch which has been opened. And they will be going in and seeing the crew right now. The change out crews, Shannon Lucid, the astronaut Shannon Lucid bringing up the rear there. The flight surgeon first who will examine the crew members. Medical checks of the crew are made immediately after landing or as soon as possible after landing. And then once they go back to the quarters here at the Kennedy Space Center, they will be going through another physical examination which will include such things as checking their blood pressure and then some tests which will include checking their vestibular responses to see how their adaptation from 0-g back to life in 1-g is progressing. This is part of an ongoing study of all the aspects of the adaptability of human beings to space flight and then their return. Everything proceeding very smoothly here at the Kennedy Space Center as the Orbiter is prepared for its return to the Orbiter Processing Facility and the turn around for the next launch of Challenger. This is Control at Kennedy Space Center, the red carpet has been put in place on the runway leading out to the steps and it says, "Welcome back to the Kennedy Space Center" and it has STS-11 printed there and then that has been crossed out and it says 41-B. This is in tribute to the new numbering system which has been put into effect for the Shuttle flights. For the first nine flights we used the numerical sequence of the flights, STS for Space Transportation System and then 1, 2, 3 through 9 for the actual number of the flight. And the last flight under that system was STS-9 which was the Spacelab mission with 6 astronauts aboard last November. We have now gone to a new system for numbering flights which are keyed to the fiscal year in which they fly. If you look at 41-B as the number of this flight, 4 stands for the fiscal year which is 1984, 1 stands for the Kennedy Space Center. If there was a 2 there that would be for Vandenberg Air Force Base out in California and B means it's the second flight of this year. So the red carpet actually has been ready ever since last summer. It was prepared originally to say welcome back KSC for STS-7. Because of weather problems there was a waveoff and the Orbiter landed at the Edwards Air Force Base in California and had to be ferried back. But this should be the first in a long, long string of landings here at the Kennedy Space Center. The vast majority will come back. It saves turn around time and cuts down on the cost of doing business in space. Kennedy Space Center, everything in readiness now for the crew to emerge from the Orbiter when they're ready. They have to undergo a brief examination by the doctor. They have to make sure that they're feeling comfortable after getting back into 1-g and then they'll come out, come down the steps into the astrovan and back to the crew quarters. This is the Control Center at Kennedy Space Center.

SPACECRAFT Okay, it's coming off. And Houston, Challenger.

CAPCOM Challenger, Houston. Go ahead.
SPACECRAFT    And these evap out temps starting up pretty fast here. It's going up to about 55 right now.

CAPCOM       Stand by.

END OF TAPE
And Houston Challenger.
Challenger Houston, go ahead.
Hey we got starting up pretty fast here, it's going up to about 55 right now.
Standby.
And Houston, Challenger, looks like it's stopped at about 56.
Roger.
Now it's coming back down.
Roger copy, thanks.

This is Control Center at the Kennedy Space Center. We have the unofficial numbers as far as the touchdown and rollout on the runway is concerned. The touchdown time was 7:15 and 53 seconds Eastern Standard Time. The wheels first touched down at the 2,000-foot mark on the runway, the nosewheel let down at 5,800 feet, and the stop was at 12,700 feet. So the total rollout time was, or distance was 10,700 feet. That's unofficial, the chemists have been sweeping over very carefully all of the various areas of the tile, taking a look now at the nose of the Orbiter to take a look at any damage that might be detected. The engineers and the managers who turnaround the Orbiter, who oversee that, like to find out as soon as possible after each phase of the mission, what has happened. This helps pinpoint what caused any knicks or any dinges, or any missing tile. There are just a little bit of missing tile back on the left OMS pod which they looked at, there is a little, few scorch marks. This is something that has been seen before in that particular area. But sweeping over the other parts, looks like a very very clean Challenger has come back to the Kennedy Space Center from space. The, occasionally there's some debris that is kicked up at landing. It doesn't appear that there was any. And it looks like the crew, headed by Vance Brand, about to come out.

(garble).
Houston, Challenger.
Challenger Houston go ahead. Go ahead Mike, Houston.
Houston, Challenger the crews getting out for the (garble) for you info.
Roger thank you we've got them on TV Mike.
PAO       This is Mission Control Houston, closeout crew
acknowledging that the Mission 41-B crew has egressed their
seats, now leaving the ship. Vance Brand first, Hoot Gibson, Bob
Stewart, Ron McNair, and Bruce McCandless. George Abbey,
Director of Flight Crew Operations, greeting them. Ground
coolings being provided by the Convoy team now, and Orbiter
systems have been shut down and the Flight Control Team here,
(garble) the convoy Commander.

END OF TAPE
KSC PAO

To the same communications channel and we'll stay on that channel from now through lift off. Our Director of Engineering, Horace Lambert, going through his various systems engineers, making sure everyone is GO for launch. We're getting GO's from all the individual systems engineers, Rockwell Manager of Engineering, Bill Edson, also reporting that Rockwell is GO for launch at this time. Everything continuing to look good, we appear headed for lift off of 41-B on time at 8:00 a.m. this morning. T-9 minutes and holding. This is Shuttle Launch Control.

KSC PAO

This is Shuttle Launch Control, T-9 minutes and holding, approximately 7 minutes into this planned 10-minute built-in hold. NASA Test Director, Stan Gross has completed his polls of the various test conductors, including those responsible for the vehicle, the Spacecraft, the range of the tracking stations and Mission Control and verified we will be ready to come out of this hold at T-9 minutes and proceed with the launch of STS-41-B at 8:00 this morning. Commander Brand and Pilot Gibson reported they were GO to resume the count and GO for launch and the final okay given by Launch Director, Bob Seek. Prior to that poll Launch Director Bob Seek, did wish the crew a very safe and successful trip, and commented that he hoped to see them back at the Cape a week from Saturday. Commander Vance Brand adding that they too hoped to be back and appreciated the very hard work that the launch team and all people associated with the Shuttle program have done to get this mission ready for launch today. Several major milestones remain between now and launch, as we come out of this hold, the ground launch sequencer will take over control of the countdown, T-7 minutes, 30 seconds where we will track the Orbiter access arm, and at T-5 minutes, Pilot Gibson, will throw the cockpit switches that will start the auxiliary power units. And we will terminate liquid oxygen fill start drain back at T-4 minutes 55 seconds, this conditions for launch and provides a proper amount of oxygen for inside the tank for flight. We will do the final start of the Shuttle main engines at T-4 minutes, and start a check of the Orbiter aerial surfaces at T-3 minutes, 55 seconds. The Orbiter will go to internal power at T-3 minutes and 25 seconds. Lock tank pressurization and the (garble) vent hood, will start at 2 minutes, 55 seconds. And our final milestone is the transfer of the onboard computers at the T-31 second mark. Engine at 3 point 6 seconds, we'll be at 90 percent thrust with a SIR ignition at T zero or 3:00 a.m. and time. Just seconds away now from resuming the countdown for an on-time launch of 41-B and its five-man crew at standard time. The countdown will begin in 4, 3, 2, 1. We are at T-9 minutes. Ground launch sequencer has been initiated.
KSC PAO Chase aircraft now beginning their take off from the Shuttle landing facility and we have turned on SRB development flight instrumentation recorders. T-8 minutes 38 seconds and counting. Mission Control has turned on the auxiliary data system and the aerodynamic identification package, that recorder will collect data from those packages during the mission for playback and evaluation after the mission.

PAO T-8 minutes and counting. Orbiter Test Conductor has requested that Houston send the store program commands. This is the final update on antenna management based on lift-off time, and sets the system which makes the Orbiter compatible with down-range tracking stations. Orbiter AC electrical bus sensors have been placed on monitor by Pilot Gibson.

PAO T-7 minutes, 30 seconds, mark. Ground launch sequencer has started retracting the Orbiter access arm, this being the walkway used by the astronauts --

END OF TAPE
KSC PAO T-7 minutes, 30 seconds, MARK. Ground launch sequencer has started retracting the Orbiter access arm, this being the walkway used by the astronauts to climb in the vehicle and that arm can be put back in place within about 15 to 20 seconds if an emergency arises and the crew must evacuate the pad. T-7 minutes and counting, MARK. Orbiter access arm being retracted by the ground launch sequencer, being moved away from the Shuttle vehicle. T-6 minutes, 30 seconds and counting.

KSC PAO T-6 minutes, Orbiter Test Conductor given Pilot Gibson a go to perform the APU prestart, Gibson will configure switches in the cockpit to put the APU's in the ready to start configuration. T-5 minutes, 45 seconds and counting.

KSC PAO T-5 minutes 30 seconds, Mission Control now transmitting the signal to start the flight recorders, these 2 recorders will collect measurements of Shuttle system performance during flight, also for playback after the mission. Flight reports that the recorders are running. T-5 minutes, 14 seconds and counting. Coming up on our next major milestone, a go for starting the 3 auxiliary power units. T-5 minutes and counting. We have a go for APU start, LOX replenish will now be terminated and LOX drain back initiated. Pilot Gibson now flipping the remaining switches in the cockpit which starts the 3 auxiliary power units. T-4 minutes, 35 seconds and counting.

KSC PAO SRB and external tanks, safe and arm devices have been armed, and inhibit remains on the S&A's until T-10 seconds, when the Range Safety Destruct System is activated. Main fuel valve heaters on the 3 Shuttle main engines have been turned on now in preparation for engine start.

KSC PAO T-4 minutes and counting. The crew has been asked to close the visors on their launch and entry helmets. Final purge sequence of the main engines now under way. T-3 minutes, 55 seconds, Orbiter aero-surface test under way. Flight surfaces being moved through a preprogrammed pattern to verify they are ready for launch. T-3 minutes, 35 seconds and counting. Orbiter ground support equipment power bus has been turned off, the vehicle is now on internal power, running off its on-board fuel cells being fed by ground reactants through the T-0 umbilicals. Aero-surface checks complete, reported to be in launch configuration now underway with the gimbal checks of the Orbiter main engines. T-3 minutes and 4 seconds and counting. Shuttle main engines now in the start position. T-2 minutes, 55 seconds, external tank liquid oxygen pressurization has started and purging of the Shuttle main engine is terminated. Retraction has started of the gaseous oxygen vent hood. Ground launch sequencer will make the final check to make sure the vent is fully retracted at the T-37th second mark. T-2 minutes, 30 seconds and counting. Orbiter Test Conductor requesting Pilot Gibson to clear the caution and warning memory system. T-2 minutes, 20
seconds and counting. Fuel cell ground supplies have been terminated, Challenger now completely on internal power, running off its onboard reactants. T-2 minutes and counting, coming up on --

END OF TAPE
KSC PAO  T-2 minutes, 20 seconds, and counting. Fuel cell ground supplies have been terminated, Challenger now completely on internal power, running off its onboard reactants.

KSC PAO  T-2 minutes and counting, coming up on liquid hydrogen replenish termination.

KSC PAO  Go for ET prepress on the liquid hydrogen tank. Vehicle now isolated from ground loading equipment. (Garble) cap now being swung out of the way in preparation for launch of 41-B, on time at 8 a.m. eastern standard time. T-1 minute, 30 seconds away from the lift-off of 41-B, and its five-man crew. At the T-1 minute mark, the ground launch sequencer will verify the Shuttle main engines are ready to start. T-1 minute, 15 seconds and counting, liquid hydrogen tank now at flight pressure.

KSC PAO  T-1 minute and counting, sound suppression systems now armed. Hydrogen burn ignitors also armed at this time. T-50 seconds and counting. Solid rocket booster development flight instrumentation quarters, going to record mode. T-42 seconds and counting. T-38 seconds, Orbiter computer's positioning vent doors launch configuration, coming up on a GO to take over control by the onboard computers and we have a GO for auto sequencer start. T-23 seconds and counting. Orbiter computers now in command of the countdown. T-15, 14, 13, 12, 11, 10, we have a GO for main engines, start, 6, 5, we have main engine start, 3, 2, 1, 0. We have solid rocket booster ignition and lift-off of Challenger and the tenth Space Shuttle flight. And the Shuttle has cleared the tower.

SPACECRAFT  (Garble) pitch program.

PAO  Houston now controlling, the roll maneuver confirmed.

CAPCOM  15 seconds.

PAO  Good roll confirmed by mission control.

SPACECRAFT  20 seconds.

PAO  5 seconds preparing to throttle down to 75 percent on the main engines.

SPACECRAFT  30 seconds, mark.

PAO  Velocity, 700 feet per second. Throttling down to 73 percent confirmed, as the vehicle prepares to pass through the maximum aerodynamic pressure. 52 second..., velocity 11,000 feet per second. Down range distance 2 nautical miles, altitude 4.7. Preparing to rethrottle the engines back up to 100 percent. 3 engines (garble) 100 percent.
CAPCOM  Challenger, Houston, you are go at throttle up.

SPACERCAFT  Roger, Houston.

PAO  Challenger and crew given a go at throttle up.  1 minute, 23 seconds; velocity 2300 feet per second; altitude, 11 nautical miles; down range distance, 9 nautical miles.  1 minute 45 seconds, velocity 3400 feet per second, altitude 17 nautical miles, down range distance 17 nautical miles. Standing by for Solid Rocket Booster separation.

SPACERCAFT  PC (garble) checking.

CAPCOM  Roger, PC.

PAO  Solid Rocket Booster separation confirmed. Guidance converging as programmed.

CAPCOM  Challenger, Houston, 1st stage performance, nominal.

SPACERCAFT  Roger, Houston.

PAO  Nominal of the first stage of ascent during the SRB performance, 2 minutes 35 seconds, velocity 4700 feet per second, down range distance 48 nautical miles, altitude 33 nautical miles.  3 minutes, velocity 5200 feet per second, down range distance 70 nautical miles, altitude 39 nautical miles. Return status in Mission Control. All positions give a go.  3 minutes, 33 seconds mission elapsed time, altitude 44 nautical miles, down range distance 101 nautical miles, velocity 6200 feet per second.

END OF TAPE
STS-41-B AIR/GROUND TRANSCRIPT  t10j  034:13:03  02/03/84  PAGE 1

PAO    All positions give a go.  3 minutes, 33 seconds
Mission Elapsed Time.  Altitude 44 nautical miles, downrange
distance 101 nautical miles, velocity 6200 feet per second.
Standing by for Press-to-Abort orbit call.

CAPCOM  Challenger, negative return, Press-to-ATO.

SPACECRAFT  Roger, negative return, Press-to-ATO capability.

PAO    That call up from CAPCOM Guy Gardener indicates
Challenger has passed beyond the point of being able to return to
the launch site in the event of an abort and the call-up for the
Press-ATO at 109 percent should an abort to orbit become
necessary, the vehicle would continue at 109 percent.

CAPCOM  ... full throttles.

SPACECRAFT  Roger, normal throttles.

PAO    That call un-, the abort to orbit could be achieved
with normal throttles as opposed to the 109 percent throttles.  4
minutes, 42 seconds, velocity 8200 feet per second, downrange
distance 179 nautical miles.

CAPCOM  Challenger, Houston, press-to-MECO.

SPACECRAFT  Challenger, roger.

PAO    Challenger given the call to press to main engine
cutoff.  Altitude 53 nautical miles, downrange distance 197
nautical miles, velocity 8900 feet per second.  5 minutes, 20
seconds, altitude 55 nautical miles, downrange distance 237
nautical miles, velocity 10,000 feet per second.  3 APU’s running
normally, 3 fuel cells running normally, all engines at 100
percent.  Standing by for the single engine TAL call.  6 minutes,
alitude 56 nautical miles.

CAPCOM  Challenger, Houston, Single engine TAL capability.

SPACECRAFT  Roger, Houston, this is really a great ride.

CAPCOM  Roger, copy.

PAO    That call up for single engine transatlantic
capability means that the Challenger could make a transatlantic
crossing and land at the Dakar TAL site if necessary.  Although
the weather at that site is not good this morning.  6 minutes, 35
seconds, altitude 57 nautical miles, downrange distance 377
nautical miles, velocity 14,000 feet per second.  Main engine cut
off expected at 8 minutes, 42 seconds.

CAPCOM  Challenger, Houston, single engine press to MECO.
SPACECRAFT: Roger, single engine press to MECO capability.

PAO That call up from CAPCOM Guy Gardener indicates that the Challenger could press on to main engine cutoff if only one engine were operational. 7 minutes, 10 seconds, altitude 57 nautical miles, downrange distance 460 nautical miles, velocity 17,000 feet per second. 3 engines at 100 percent. 7 minutes, 32 seconds, velocity 18,000 feet per second, downrange distance 520 nautical miles, altitude 57 nautical miles. Standing by to throttle engines down to maintain the maximum 3-g force on the spacecraft. Engines throttling down at the present time. All engines throttling down. 8 minutes, 10 seconds, 58 nautical miles altitude, 647 miles downrange, velocity 22,000 feet per second. Standing by for main engine cut off.

SPACECRAFT We've got a MECO.

CAPCOM Roger, copy MECO.

SPACECRAFT Looks good.

PAO Main engine cutoff confirmed. 6 minutes, 55 seconds, altitude 60 nautical miles, downrange distance 800 nautical miles, velocity 24,000 feet per second. Standing by for external tank separation. ET sep confirmed. OMS 1 status check in Mission Control, all positions give a go. The delta-V, the change in velocity for the OMS 1 burn will be 251 feet per second.

CAPCOM Challenger, Houston, it'll be a nominal OMS-1, the targets look good, APU should --

END OF TAPE
PAO ET SEP confirmed. OMS 1 status check in Mission Control. All positions give GO, the Delta-V, the change in velocity for the OMS 1 burn, will be 251 feet per second.

MCC Challenger, Houston, there will be a nominal OMS 1, targets look good, APU shutdown on time.

SPACECRAFT Roger, nominal OMS 1, APU shutdown on time.

PAO Crew giving a GO for normal shutdown on the APU's after they have completed their job, that will be shut down shortly, and the positions in Mission Control indicate that everything is going as planned for the nominal OMS 1 burn, the first burn of the orbital maneuvering systems. That will put the spacecraft in a stable orbit. Ignition on both engines, both engines looking good.

MCC Challenger, Houston. The burn looks good, we'll be handing over to TDRS.

SPACECRAFT Roger, Houston, yeah we're in the middle of the burn.

PAO (Garble) here in Mission Control, reporting that the three main engines are being prepared for their on-orbit stowed configuration. Remaining propellants and the lines are dumped and later there will be a purge of those lines. Communications handed over from the ground stations to the tracking data relay satellite.

MCC Challenger, Houston, with you on TDRS.

SPACECRAFT Roger, Guy. Burns going good.

MCC Roger, loud and clear, Vance.

PAO Propulsion Officer here in Mission Control and the officer reports that the indications are the OMS 1 burn is going well. Propulsion systems looking good. We've had cut off of the two OMS engines. Change in velocity, 251 feet per second, put the Challenger in its stable orbit. That orbit will be circularized with the orbital maneuvering system burn number 2. That occurs at about 45 minutes into the mission. First OMS 1 burn, results in an orbit of 165 by 51 nautical miles. The second OMS burn will result in the circular orbit 165 by 165.

SPACECRAFT Okay guys, as you can see we're in program 105 and proceeding on.

MCC Roger, we see that.

PAO Mechanical systems officer reports that the 3 APU's
auxiliary power units that provide the power to the hydraulics have shut down on time, and all looked good. Three fuel cells are all operating normally, all producing about 7 kilowatts.

MCC Challenger Houston, we'll be handing over to Dakar in about 30 seconds.

SPACECRAFT Roger, Houston.

PAO Communications handing over from the tracking data relay satellite to the Dakar ground station. 18 minutes, and 10 seconds, mission elapsed time.

MCC (Garble) Dakar for 6 minutes.

SPACECRAFT Roger, over Dakar.

MCC This is Mission Control, the Flight Dynamics Officer reports that the OMS 2 burn, to circularize the orbit at 165 nautical miles, will be 205 feet per second. That burn will be as planned, everything very normal up to this point.

CAPCOM Challenger Houston, OMS 2 will be nominal, the targets look good, and we're standing by for gimbal check whenever you guys are ready.

SPACECRAFT Okay, here it comes.

PAO Crew performing a check,

SPACECRAFT OMS 2 of the target nominal.

CAPCOM Roger that, and they look good, what we're looking at.

PAO Crew performing the gimbal check of the OMS engine, that is the thrust vector control system.

END OF TAPE
CAPCOM                  Roger that, and they look good, what we're looking at.
PAO                     Crew performing the gimbal check of the OMS engines, that is the thrust vector control system.
CAPCOM                  Challenger, Houston, the gimbal check looked good on the ground.
SPACECRAFT                Yes, good, it looked good here too, Guy.
CAPCOM                  Roger.
PAO                     And this is Mission Control at 21 minutes.
SPACECRAFT                (Garble) OMS-2 burn attitude.
CAPCOM                  Roger, we see that.
PAO                     21 minutes, 22 minutes now into the flight. The crew maneuvering to the proper attitude for the ignition of the OMS engines for that 2nd orbital maneuvering system burn which will circularize the orbit at 165 nautical miles. That burn will be coming up in about 23 minutes. That will be a 205-foot per second change in velocity. Crew completed the check of the thrust vector controls, the primary and the secondary systems. Those are the controls which tilt the NOSL's of the OMS engines to change the direction of thrust that is the method of controlling the direction in the spacecraft during that burn. The crew completed the vacuum inerting of the main propulsion system, the 3 main engines, clearing out all the residual propellants, and stowing those engines in their final on-orbit position.
CAPCOM                  Challenger, Houston, we'll be handing back to TDRS in 30 seconds.
SPACECRAFT                Okay, we'll expect that.
CAPCOM                  Challenger, Houston with you back on TDRS for another 18 minutes.
SPACECRAFT                Okay, copy.
PAO                     Mission Control at 26 minutes into the flight. Status check in Mission Control here by Flight Director Gary Cohen. Those systems engineers which are concerned with the OMS-2 burn all give a GO for that burn. Crew of the Challenger has just completed maneuvering the vehicle to the proper position for the start of that burn which will take place in about 18 1/2 minutes.
SPACECRAFT  Houston, Challenger.

CAPCOM  Challenger, Houston, we saw the therm message, we're looking at it.

SPACECRAFT  Okay. We're seeing it on the fuel - gas generator fuel pump heater on APU number 1 and is that related to that heater?

CAPCOM  Standby, Hoot, we'll look at it.

SPACECRAFT  Houston, Challenger, what we're seeing on APU-1 is the injector temp going down at 243, the other is up around 900 to 1000.

CAPCOM  Challenger, Houston. Hoot, that is the problem for the message, and that's a ducer bias. No action on your part.

SPACECRAFT  Okay, we copy a ducer bias.

PAO  This is Mission Control at 28 minutes Mission Elapsed Time. That discussion there between the crew and Mission Control about the temperature indication on one of the auxiliary power units. It was noticed prelaunch that there was a bias in one of the transducers, one of the pieces of equipment that sends readings to the instruments on what the temperatures are, and that is believed to be a faulty piece of instrumentation. And there is no action required on the part of the crew.

CAPCOM  And Challenger, Houston, with a note on the APU's.

SPACECRAFT  Okay, go ahead, Guy, on the APU's.

CAPCOM  Ok, Hooter, we'd like to get a little more cooling, so we'd like you to take the APU fuel pump valve coolant bravo to auto also.

SPACECRAFT  Ok, Guy, that's done I got the B going also.

CAPCOM  Thank you. And Challenger, Houston, you can ignore the last thermal APU message you got, that is due to the pump out temps going up, and that's why we had you turn the bravo valve to auto.

SPACECRAFT  Ok, we copy that, Guy.

CAPCOM  Challenger, Houston, just for your information, we are seeing some good cooling on the APU's, looks like it's working fine.

SPACECRAFT  Ok, we copy, thanks Guy.
AIR/GROUND TRANSCRIPT  034:13:39  02/03/84 PAGE 2

CAPTAIN: On time, nominal, real good burn. Only thing to
noted was this small anomaly, whenever we turn off the flight
control power switch on the right side, it makes the DAP go
manual. So just something we will have to keep

CHALLENGER: Challenger, Challenger, Houston, I copied that,
Thank you, over.

CAPTAIN: Roger.

MISSION CONTROL: Mission Control Houston, 52 minutes mission elapsed
since the 2nd burn of the Orbiter maneuvering systems was on
nominal, as planned. Looked good, Flight Dynamic Officer
reported that the results of that burn looked good, and the crew
indicated everything went well with it. They did indicate that
there was only slight problem and that was they noticed that
when they turned the power off to one of the flight control sets
in the cockpit, that it threw a switch from auto
to manual, they will just have to remember to watch that
whenever they make that power cycle. We're passing over the
Farragut station right now. The Challenger will be in
communication with the Control Center, for another 6 1/2 minutes
through Farragut. Then we have a loss of signal period for
several minutes before we pick up again over Hawaii, about 24
minutes from now. So we would be out of communication for about
12 minutes.

END OF TAPE
PAO: -- signal period for several minutes, before we pick up again over Hawaii about 24 minutes from now. So we will be out of communication for about 18 minutes. The crew will be activating the radiator - for cooling through the radiators in about 15 minutes or so. And then they will be begin the activities for opening the payload bay doors and deploying the radiators.

SPACECRAFT: Houston, Challenger, how do you hear?

CAPCOM: Challenger, Challenger, Houston, go ahead, over.

SPACECRAFT: Okay, we're into post-insertion, page 1 dash 7 and we've just got Mr. Spock going, our little friendly computer and he had a real neat greeting on his first frame that we saw here.

CAPCOM: Challenger, Challenger, Houston, copy. Thank you, over.

CAPCOM: Challenger, Challenger, Houston, we're 1 minute to LOS, we'll see you at Hawaii at 1 + 18.

SPACECRAFT: Roger, Guy.

PAO: And this is Mission Control Houston, at 1 hour, 1 minute elapsed time, we have loss of signal through the Yarrgadee station in Australia, and we'll be out of communication with the Challenger for about 16 1/2 minutes, till we reacquire over Hawaii. Everything seems to be going very well through the ascent phase, and now the 2 OMS burn having been completed and Challenger in its 165 nautical mile circular Orbit. Getting all set for normal orbit operations. Crew will begin the payload bay door operations, in about 10 minutes, and will be deploying the radiators for the cooling of the Spacecraft. Not too long after that, about 30 minutes following that, we will get the go/no go from Mission Control for the on-orbit operations. At 1 hour, and 2 minutes mission elapsed time, this is Mission Control Houston.

PAO: Mission Control Houston, 1 hour 16 minutes, mission elapsed time, we're about a minute away from picking up the Challenger and crew over the Hawaii tracking station. The crew should be beginning to perform their payload bay door activities in which they will unlatch the payload bay doors and deploy those and then deploy the radiators for cooling of the spacecraft. And then about 20 minutes from now we should also be getting the Mission Control go/no go decision for continued on-orbit activities. 1 hour, 17 minutes, this is Mission Control Houston.

CAPCOM: Challenger, Houston, with you through Hawaii for 7 minutes.
SPACECRAFT  Okay, Houston, loud and clear, and we're maneuvering to payload bay door opening attitude. The (garble) configuration is complete.

CAPCOM  Roger, Vance, we copy that, and I've got a couple of questions for you, the one we just wanted to check to see if the teleprinter was hooked up.

SPACECRAFT  Negative, not yet.

CAPCOM  Okay, copy, you can just let us know when that gets done, we haven't got any messages pressing for you, and I've got a note on the flight controller power DAP down mode phenomena.

SPACECRAFT  Okay, go ahead.

CAPCOM  Okay, it's, we saw that on flights 1 and 4, we're not, we don't have any fix for it. You will just have to be aware of that problem as you said, apparently the switch activation to off causes a transient spike in the DDU which makes it look like a signal from the RHC.

SPACECRAFT  Okay, thanks. Yeah we'll just have to be alert with it. Not that much of a problem.

CAPCOM  Roger, I concur.

END OF TAPE
SPACECRAFT  Ok, thanks, we'll just be alert with it. Not much of a problem.

CAPCOM    Roger, I concur.

SPACECRAFT Houston, Challenger.

CAPCOM    Challenger, Houston, go ahead.

SPACECRAFT Yes, Guy, we're assuming you're going to give us a go for orbit OPS and we're looking for a go on the payload bay doors, over.

CAPCOM    Roger, you're GO on the doors, and we'll give you a GO for orbit OPS about over MILA.

SPACECRAFT Ok, thanks Guy.

CAPCOM    Challenger, Houston, we're about 50 seconds to LOS, we'll pick you up at Goldstone in 4 minutes.

SPACECRAFT Ok.

CAPCOM    And Vance, be advised, we'll be staying on the STDN sites across the states, and we'll pick up TDRS after we LOS at Bermuda.

SPACECRAFT Copy.

PAO  This is Mission Control Houston, at 1 hour, 25 minutes into the flight of Mission 41-B. Challenger now passing out of range of the Hawaii tracking station and we'll be picking up over Goldstone in about 3-1/2 minutes. The Challenger has been maneuvered to proper attitude for opening the payload bay doors which should occur as they pass over the continental United States, they were given a go for opening the doors by Mission Control and asked if they were go for orbit operations. Flight Director Gary Cohen indicating that they would pool the room very shortly to get all positions opinion as to whether the spacecraft is go for orbit operations, but there seem to be very few things out of the ordinary on the flight so far, so we fully expect that they will be given the go for orbit operations as they pass over the continental United States here shortly. And we may also be getting the television of the payload bay door opening as they go over the MILA station. Mission Control Houston, 1 hour, 28 minutes Mission Elapsed Time, we're within the range of the Goldstone station.

CAPCOM    Challenger, Houston with you through Goldstone.

SPACECRAFT  Hello, Houston, we've got you through Goldstone, the port door is just coming open now.
CAPCOM       Roger, copy, Hoot. Challenger, Houston, you're go for orbit OPS.

SPACECRAFT  Roger, go for orbit OPS.

CAPCOM       Roger, and be advised that we get to MILA here in about 2 minutes, we're going to be eavesdropping on your payload TV, we'll just select different cameras, we won't try to move any from you.

SPACECRAFT  Ok, fine.

PAO          Mission Control Houston, 1 hour, 33 minutes Mission Elapsed Time, the crew now has a go for on-orbit operations and the payload bay doors are coming open. A few minutes ago the pilot, Hoot Gibson, reporting that the port door was coming open and flight controllers here in Mission Control looking at the data, the cooling from the radiators, which then become effective once those doors are open, that cooling appears to be working.

SPACECRAFT  (Garble) CRT-1, Guy.

CAPCOM       Roger, thank you, Vance.

PAO          This is Mission Control, 1 hour, 36 minutes Mission Elapsed Time, data coming down from the spacecraft a moment ago indicated the crew was powering up one of control devices to close the protective sunshield on the Palapa, that is the Indonesian satellite. And we now have some television coming down from the spacecraft.

CAPCOM       Challenger, Houston with you thru MILA, getting some good looking TV down here and you are - the SPEC 1 is yours.

SPACECRAFT  Ok, thanks.

CAPCOM       Roger, and you're go to turn the high load evap off.

SPACECRAFT  Roger, go for high load evap off.

CAPCOM       Roger, Vance, and just one reminder, the change to the deorbit prep - -

END OF TAPE
CAPCOM  Challenger, Houston, with you through Mila, getting some good looking TV down here. And you are - the Spec 1 is yours.

SPACECRAFT  Okay, thanks.

CAPCOM  Roger, and you're go to turn the high load Evap off.

SPACECRAFT  Rober, go for high load Evap off.

CAPCOM  Roger, Vance, and just one reminder, the change to the deorbit prep - emergency deorbit prep checklist Delta's in the back of your ascent pocket if you want to save that before you stow it.

SPACECRAFT  Okay, yeah, we'll get those pages put in.

CAPCOM  Rog, thanks.

PAO  This is Mission Control, we can see the sunshield on the Palapa satellite closing over to protect that satellite's delicate electronics and other parts from the direct radiation of the Sun prior to the time that it will be opened again for the deployment of that satellite, which will come about a day or so into the flight. The Westar there in the foreground, the sunshield is still open on that satellite, and I'm sure they will be closing that one shortly. That will be the first one which will be deployed and that is later today. In the foreground before the, in front of the Westar satellite, you see the top row of instruments on top of the shuttle pallet satellite. That piece of hardware later on in the flight will be handled by the remote manipulator system, the mechanical arm. And off to the left of the picture there is the grapple fixture which is the point, at which the arm will attach itself and move the SPAS out of the payload bay.

CAPCOM  Challenger Houston, be advised you are go for vernier jets. And you can go ahead at your convenience Vance, no need to wait till 2 + 05.

SPACECRAFT  Okay, go for verniers and we'll do that right away.

PAO  This is Mission Control, 1 hour 41 minutes, the crew has begun punching the buttons to start closing the sunshield on the Westar satellite and we see that beginning to move at the present time. Both of the satellites are similar to ones which we have taken up earlier on the space shuttle. They are the cylindrical design satellites which are carried aloft for their first stage of their ride in the space shuttle's cargo.
bay. And then at an appropriate time, they are ejected from the
cargo bay of the Shuttle, clamps are released and a spring
mechanism will eject the satellite and its upper stage from the
Shuttle's cargo bay and then about 45 minutes later, the attached
solid rocket motor on the satellite then boosts it up to its high
point of it's geosynchronous Orbit and then later when engineers
of the companies that own those, or the foreign governments that
own those satellites are satisfied that they are in the proper
transfer orbit, then they fire an additional motor which
communicates their orbit, and the spacecraft then drift over a
period of a few days usually into their parking orbits over the
locations on the points of the earth's surface that they will be
serving as communications satellites.

SPACECRAFT    Houston, Challenger.

CAPCOM        Challenger, Houston, go ahead.

SPACECRAFT    We seem to have a bit of a problem with camera
delta, the tilt will not work at all. The pan seems to be
(garble). The pan works very, very slowly, but the video is
good.

CAPCOM        Roger, Ron, copy that camera delta, no tilt and a
slow pan.

SPACECRAFT    Okay.

CAPCOM        And we're just lost our TV, we're on Bermuda now,
and we had some good TV shots of both sunshields closing.

SPACECRAFT    Great, glad to hear it.

CAPCOM        Challenger, Houston, we'd like an SM spec 1 please.

SPACECRAFT    Okay Guy, we're going to put it up on CRT 2.

CAPCOM        Roger, thank you.

END OF TAPE
Ok, Guy, we're going to put it up on CRT-2.

Roger, thank you. And Challenger, we'll be handing over to TDRS here in about 30 seconds.

Ok, Houston, we copy.

Challenger, Houston with you through TDRS for another 1/2 hour.

Ok, Houston, got you loud and clear on TDRS.

Roger, loud and clear also.

(Garble)

Challenger, Houston, SM SPEC 1 is yours again, thank you, and you're go for the ITEM 48's to both GNC and SM.

Ok, we copy that, that (garble), Guy?

Roger, that's affirmative, Hoot.

Houston, Challenger, the (garble) heaters are activated and the primary ATC works fine.

Roger, sounds good, Ron, and we'd like you to have the Palapa ASE PAM heaters to auto, please.

Ok, we'll get that.

Challenger, Houston, with a question on the Palapa.

Go ahead, Houston, with your question.

Roger, since the SCA is powered off, we don't have any insight in the heater power and we just wanted to confirm that you got a gray heater talkback.

Yes, Guy, we powered up the SCA and cycled that (garble) heater switch to the auto position, where it is now and powered the SCA back down, that's our current configuration.

Roger, copy, thanks.

And we did show a gray talkback while the SCA was powered.

Roger, thank you, Ron, that's what we wanted to hear. Thank you.
PAO        This is Mission Control at 2 hours, 12 minutes
Mission Elapsed Time, the crew has completed the purge of the
fuel cells and they look good and they continue going through the
procedures powering up the various spacecraft systems that will
be necessary for their on-orbit operations. We have about 5
minutes left in the pass here through the Tracking Data Relay
Satellite and after that it's about a 9-minute gap until we pick
up over Yarragadee.

CAPCOM    Challenger, Houston, with UHF over Botswana, looks
like TRDS has dropped out on us here, got a couple of notes for
you.

SPACECRAFT  Roger, go ahead.

CAPCOM    Ok, at 2+25 on the APU coolant reconfiguration,
since you've got them both on, we'd just like at that point to
turn the Alpha valve off, and then the INCO just wanted to check
if you had done the Ku-band activation at 1+52.

SPACECRAFT  Ok, that's being worked on right now, the
activation.

CAPCOM    Roger, thank you, Vunce, and we've got about a
minute left at Botswana, we probably won't get TRDS back, so
we'll see you guys at Yarragadee at 2+28.

SPACECRAFT  Ok, see you there, and Hoot's taking care of that
APU.

CAPCOM    Roger, thanks.

PAO        This is Mission Control at 2 hours, 15 minutes
Mission Elapsed Time, we've had communication through the
Botswana Tracking Station and not currently up with the Tracking
Data Relay Satellite. If we do not get the communication through
that satellite on the remainder of the pass during which the
Challenger is within range of that, then we'll pick up again over
Yarragadee in about 11 minutes. Brand, Commander Vance Brand,
reporting that --

END OF TAPE
PAO If we do not get the communication through that satellite on the remainder of the pass, during which the Challenger is within range of that, then we'll pick up again over Yarragadee in about 11 minutes. Brand, Commander Vance Brand, reporting that Pilot Hoot Gibson was going ahead with the activation of the Ku-band antenna. And the crew proceeding along the time line through the post insertion checklist. After the spacecraft is on orbit, the crew goes through this list of procedures to power on all the systems and set up all the equipment that they will use during orbit.

CAPCOM Challenger, Challenger, Houston with you through Yarragadee for 7 minutes, over.

SPACECRAFT Roger Houston, loud and clear

CAPCOM Challenger, Challenger, Houston, you are loud and clear also Vance, over.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Challenger, Houston, go ahead, over.

SPACECRAFT Okay Guy, I wanted to make sure on the APU cooling system one more time. You want the A off, O, F, F, and the B as in auto?

CAPCOM Challenger, Challenger, Houston, that's affirmative, Hoot, over.

SPACECRAFT Okay, thanks.

SPACECRAFT Houston, this is Challenger, over.

CAPCOM Challenger, Challenger, Houston, go ahead, over.

SPACECRAFT Roger, the Ku-band activation and checkout is complete, it's your system.

CAPCOM Challenger, Challenger, Houston. Rog, thank you Bruce, over.

SPACECRAFT And Guy, the RMS is powered, it's in monitor, and and the (garble)

CAPCOM Challenger, Challenger, Houston. Copy, Ron, thanks, over.

PAO Mission Control Houston, 2 hours, 31 minutes mission elapsed time. Mission Specialist, Bruce McCandless, reported a few moments ago that they had completed the activation of the Ku-band antenna. That it has been deployed, and turned
on, and warmed up and ready for use in the communications. Spacecraft communications coming through the Yarrgaddee tracking station, Western Australia, we have about 3 1/2 minutes remaining in that pass. The spacecraft will catch just the edge of the Guam station at the beginning of Orbit number 3.

CAPCOM Challenger, Challenger, Houston, 1 minute till LOS, we'll see you for a short pass at Guam, at 4 2.

SPACECRAFT Okay, Guy, see you there.

PAO And this is Mission Control Houston, 2 hours, 36 minutes mission elapsed time. Challenger is passing out of range of the Yarrgaddee tracking station and we'll pick up again in about 5 1/2 minutes or so over Guam. Crew has now moved into the regular crew activity plan. The document which lists all these activities in detail. Now that most of the set-up preparations for on-orbit operations have been completed. Crew is preparing to do their alignments of the inertial measurement units. Those are part of the system which helps the Orbiter to know its position. And they are proceeding with unstowing cabin equipment and the assembly of some of the cabin television equipment. The first major event of the flight will be the deployment of the Westar satellite. The crew begins to review the deploy activities and procedures at about 6 hours, 20 minutes into the flight. And the actual deployment takes place at 8 hours into the flight. That's the point at which the satellite is ejected from the shuttle payload bay and it moves away from the shuttle. The shuttle on its own then, does a separation maneuver, by firing orbital maneuvering system engines to give it a safe distance from the satellite when its own solid rocket motor fires off to put it in its transfer orbit. We're about 4 minutes away from a brief pass over the Guam station and then we'll catch Hawaii and that will be, Hawaii will be about 15 minutes from now. At 2 hours, 38 minutes, this is Mission Control Houston.

END OF TAPE
PAO -- does a separation maneuver by firing orbital maneuvering system engines to give it a safe distance from the satellite when it's own solid rocket motor fires off to put it in its transfer orbit. We're about 4 minutes away from a brief pass over the Guam station and then we'll catch Hawaii and that will be, Hawaii will be about 15 minutes from now. At 2 hours, 38 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, with you through Guam for 3 minutes.

SPACECRAFT Hi, Houston, got you at Guam.

CAPCOM Roger, you're loud and clear also.

CAPCOM Challenger, Houston, with a note on the IMU align stars.

SPACECRAFT Go ahead, Guy.

CAPCOM Roger, recommend that you use backup star pair bravo 1 versus the alpha 2 in there now, and the AOS on those stars will be at 2 + 51.

SPACECRAFT Okay, we copy that, bravo 1 and they're going away at 2 + 51.

CAPCOM Negative, they'll be AOS at 2 + 51.

SPACECRAFT Okay, copy AOS 2 + 51.

CAPCOM Roger, Hooter.

CAPCOM Challenger, Houston, we're going LOS in 30 seconds, we'll see you at Hawaii at 5 4.

SPACECRAFT Okay, see you in Hawaii at 5 4.

PAO Mission Control Houston, 2 hours 46 minutes, mission elapsed time. Challenger passing out of range of the Guam station. We have a 7-minute break here in communications until we pick up over Hawaii. The crew is continuing to clean up all the leftover items from the ascent, and will be continuing to set up equipment, unstow the items around the cabin that they will be using in flight, and then very shortly be getting into a meal preparation time. They will be doing that in about an hour. And after that they will be picking up with reviewing the procedures and checking out the equipment prior to the deployment of the Westar satellite. This is Mission Control Houston.

CAPCOM Challenger, Houston with you through Hawaii for 8 minutes.
STNS-41-B  AIR/GROUND TRANSCRIPT  t19j  034:15:37  2/3/84 PAGE 2

SPACECRAFT  Roger Houston, loud and clear.

CAPCOM  You're loud and clear too, Vance.

SPACECRAFT  And we're picking up star pairs Bl, no problem.

CAPCOM  Roger, copy, sounds good, and I've got some switches back on panel A-11 if somebody's handy.

SPACECRAFT  Go ahead, Guy, on A-11.

CAPCOM  Roger, Bob, I would like all 4 of the cryo tank 4 heaters to auto, that's O2 and H2 alpha and bravo.

CAPCOM  And Challenger, Houston, we've got the IMU star data and you're go ahead and torque the stars.

SPACECRAFT  Roger, copy.

SPACECRAFT  And Houston we torqued at 2 hours 55 minutes, 58 seconds.

CAPCOM  Roger, copy, Vance, and we've got the data.

SPACECRAFT  Roger.

CAPCOM  Challenger, Houston, I've got a note for you on the manual cabin atmosphere procedure at 3 + 05.

SPACECRAFT  Standby. Okay, go ahead.

CAPCOM  Roger, Vance, after you perform the setup procedure we'd like you to take the O2 reg inlet system 1 and 2 valves, both of them open. That's down on MO10W.

SPACECRAFT  Okay, you were cut out, please repeat.

CAPCOM  Okay, following the setup of the cabin atmosphere, we'd like on MO10W, the O2 reg inlet system 1 and 2 valves, both of them to open.

SPACECRAFT  Okay, on, after the cabin setup, on MO10W, O2 reg system 1 and 2 to open.

CAPCOM  That's affirmative, Vance.

END OF TAPE
CAPCOM: -- valves, both of them to open.

SPACECRAFT: Okay, after the cabin setup on M010W 02 reg system 1 and 2 to open.

CAPCOM: That's affirmative, Vance.

CAPCOM: And Challenger, Houston, we're going LOS Hawaii here in 30 seconds, and be picking up TDRS in about a minute.

SPACECRAFT: Okay, see you in a minute.

PAO: And this is Mission Control, at 3 hours, 1 minute, mission elapsed time. We'll be picking up through the tracking data relay satellite in about a minute and a half here. Challenger on orbit $3$. Things thus far in the mission have gone very well, very few problems or even minor system things to work. The crew was given some instructions on the manual management of the cabin atmosphere. The procedures will be somewhat different on this flight, for the management of the cabin atmosphere, due to the 2 planned EVA's, in order to help cut down on the prebreathe time that has been required on a earlier EVA, as shuttle flight 6 where 3 or 3 1/2 hours of prebreathe time was required, cabin pressure will be allowed to decay and down to a point where there will be much less prebreathe time required before the crew goes on pure oxygen at the reduced pressure, that is, those members of the crew, Bruce McCandless and Bob Stewart who will be doing the spacewalk on flight day 5, and the other EVA on flight day 7.

CAPCOM: And Challenger, Houston, with you on UHF through Goldstone, we're still trying to lock up on TDRS K-band.

SPACECRAFT: Okay.

CAPCOM: Challenger, Houston, with you on TDRS S-band low data rate.

SPACECRAFT: Okay, okay, very good.

PAO: Mission Control Houston, at 3 hours 13 minutes mission elapsed time. Challenger passing now out over the Gulf of Mexico, just having passed over the southwest United States, and northern part of Mexico. The crew has been setting up the cabin equipment. And checking out the onboard systems, caution warning.

SPACECRAFT: Houston, Challenger, we're watching you go by.

PAO: They are now setting up, making sure, checking out the Ku-band system for the communications and television and
data flow that operates through that high data rate system. Spacecraft is in an orbit approximately 165 nautical miles circular, just a slight bit lopsided, the high point being about 166 nautical miles and the low point being 165 and 1/2.

CAPCOM With you on Ku-band, we copied whose comment before, but I had no uplink then.

SPACECRAFT Okay, we're hearing you now.

CAPCOM Roger. Challenger, Houston, with a note on the WCS.

SPACECRAFT Okay, go ahead.

CAPCOM Roger, we're seeing stall occurrence on fan separator motor number 1, we'd like you to switch to fan sep number 2.

SPACECRAFT We wondered if something was wrong.

CAPCOM Roger.

SPACECRAFT Okay, we'll switch fan sep 2.

CAPCOM Roger, thank you.

PAO Mission Control Houston, at 3 hours 26 minutes, mission elapsed time. That communications between Commander Brand and the Capcom Guy Gardner over the fan separator number 1 in the WCS, the waste containment system. The, one of the technicians here in Mission Control indicating that there data shows stall occurrence when that fan separator runs and that separator does not appear to be working. That all part of the Orbiter toilet system, so they have switched to the backup fan separator number 2.

END OF TAPE
PAO -- currents when that fan separator runs and that separator does not appear to be working. That all part of the Orbiter Toilet System so they have switched to the backup fan separator number 2 and the ECOM Officer here in Mission Control reports that the secondary system looks good.

CAPCOM Challenger, Houston, be advised that fan sep 2 looks good.

SPACECRAFT WCS EMU mode fan sep 2 makes what you'd call a normal sort of a whining noise. I mean the fan makes a normal noise with the fan sep in the 2 position. In 1 position it doesn't sound like it's coming up to full speed.

CAPCOM Roger, we copy and concur. It looks like number 1 is stalling out on us.

SPACECRAFT All indications agree.

CAPCOM Challenger, Houston, with a note on the Palapa.

SPACECRAFT Go ahead, Houston.

CAPCOM Roger, we have some concern in the data we're seeing, we saw rather, on the Palapa heaters. What we'd like you to do is, at your convenience here, perform a deepree-deploy PAM ASE thermal test. And use the procedure there on page 2-5 of the PAM deploy checklist.

SPACECRAFT Ok, I'll do that, the pre-deploy thermal test on 2-5.

CAPCOM Roger, and that's just on the Palapa.

SPACECRAFT Palapa, copy.

PAO Mission Control Houston at 3 hours, 32 minutes Mission Elapsed Time. Payloads Officer here in Mission Control has requested that the crew perform a temperature check on the airborne support equipment associated with the Palapa satellite. That is all the equipment that stays behind in the Shuttle's cargo bay after the satellite is deployed, all the cradle and handling equipment that is associated with keeping the satellite mounted in place. There was some indication earlier that there might not be - the heaters on that system might not be on. They are concerned about, of course, keeping that equipment warmed up while there is no Sun shining on that to keep that warmed up, it does get very cold and if it's not up to a reasonable temperature, they sometimes could have difficulty operating some of that equipment which is very important in the deployment of that satellite.
SPACECRAFT    Houston, this is Challenger, temperature check is underway, are you picking anything up?

CAPCOM      Challenger, Houston. Roger, we're getting the data and it looks good.

SPACECRAFT  Ok, I understand it looks good.

CAPCOM      That's affirmative, Ron. And Challenger, Houston. Ron, the data looks good, you can terminate the temp check, thank you.

SPACECRAFT  Ok, we copy that.

PAO         This is Mission Control, 3 hours, 35 minutes. The payloads people are satisfied with the data they've seen from the temperature check of that airborne support equipment associated with the Palapa satellite. They had been concerned that the heaters were not functioning, or at least we weren't getting any indication from the data that the heaters were functioning and keeping that equipment warm. Now after this check they are satisfied that those heaters are working and that equipment is all in good order.

SPACECRAFT  Houston, Challenger.

CAPCOM      Challenger, Houston, go ahead.

SPACECRAFT  Guy, I'm getting ready to deactivate the APU steam vent heaters, do you need them to run any longer?

CAPCOM      Standby, Hoot. And Challenger, Houston, you can go ahead and turn those off.

SPACECRAFT  Ok, thanks Guy.

CAPCOM      Roger. And Challenger, be advised, we're getting in kind of a poor area of reception for TDRS coverage and we will have Botswana though for another 8 minutes, if you need us.

SPACECRAFT  Ok, copy. And be advised, we have the usual small cloud of particles flying with us --

END OF TAPE
CAPCOM And Challenger, Houston. Hoot, you can go ahead and turn those off.

SPACECRAFT Okay, thanks, Guy.

CAPCOM Roger.

CAPCOM And Challenger, be advised we're getting in kind of a poor area of reception for TDRS coverage and we will have Botswana though for another 8 minutes if you need us.

SPACECRAFT Okay, copy. And advise we have the usual small cloud of particles flying with us outside the spacecraft.

CAPCOM Roger, copy.

PAO This is Mission Control, Houston. Challenger's attitude right now presents an antenna pointing configuration which is less than optimal so we will be in contact through the ground station at Botswana for another 6 minutes and at LOS Botswana there will still be another about a minute remaining of marginal communication capability through TDRS.

CAPCOM Challenger, Houston. Going LOS here at Botswana. Will see you at Guam at 4 plus 15.

SPACECRAFT Okay Guy. We'll see you there.

PAO This is Mission Control, Houston. We've lost capability to communicate through Botswana and we're just moments away from being out of sight of the TDRS but due to the bad pointing angle it's unlikely there'll be any attempt at communicating with the vehicle very effectively at LOS. At mission elapsed time 3 hours, 52 minutes. The early onorbit activities are continuing onboard the Challenger. Commander Vance Brand's been stowing cabin equipment at this point and setting up for orbit operations. And the other members of the crew join in that activity. Pilot Hoot Gibson would be performing tests of several alarm lights and fire suppression system and deactivating the auxiliary power unit (garble) vent heaters. We'll acquire again in about 22 minutes through Guam. This is Mission Control, Houston.

PAO This is Mission Control, Houston, at 4 hours, 12 minutes mission elapsed time. We'll have signal through Guam in about 3 and a half minutes. Handover has been completed in the Mission Control Center and Flight Director Harold Draughon and the Crystal Team have assumed duties in Mission Control. The handover debriefing was remarkably free of problems as Harold Draughon and his team inherited flight control of this mission. Discussion principally concerned the LANDSAT Earth station at Hawaii which is expected to be recovered shortly and will
certainly be recovered by Rev 6 at which time we're scheduled to have downlink television of the Westar predeploy activities that is to occur at mission elapsed time 7 hours, 42 minutes. The anticipation is that the Earth station will be back online for that event and in the event it may not be for some reason they're looking at work-around procedures to recover that. Also, of course, camera delta - the color camera mounted on the starboard side of the forward bulkhead has proven to be troublesome. It doesn't appear to be, have the ability to tilt. The pan mechanism operated slowly, more slowly than nominally expected and the color wheel is under suspicion and, of course, there's discussion on how to check out and alleviate that problem.

END OF TAPE
PAO --- color camera mounted on the starboard side of the forward bulkhead has proven to be troublesome, doesn't appear to be, have the ability to tilt, the pan mechanism operated slowly, more slowly than normally expected and the color wheel is under suspicion and of course, there is the discussion how to check out and elevate that problem and whether it should be done from here in the MOCR or by the flight crew. That camera would figure prominently in television opportunity for the PAM deployments and for the EVA as well. We're a minute away from AOS, through Guam, mission elapsed time 4 hours, 14 minutes, this is Mission Control Houston.

CAPCOM Challenger Houston with you through Guam for 8 minutes.

SPACECRAFT Hello, Houston, we've got you loud and clear. Throw her back, she's too small.

CAPCOM Throw one back, he's too blue, and we've got a couple notes for you.

SPACECRAFT Okay, we're ready to copy, Mary.

CAPCOM First of all, we're going to be sending a state vector up to you this pass, and I've got a couple changes to your CAP if you're ready to pull your CAP, page 4-2, 4-3.

SPACECRAFT Okay, stand by just a second, Mary.

CAPCOM We're standing by.

SPACECRAFT Okay, Mary, go ahead.

CAPCOM First of all on page 4-2, for the PLT there's a call out on RQ to do a couple switch actions on panel R2, the APU fuel pump valves, etc. That will be delayed and it will still occur on our call, but it's not going to be coming up at that time. Also on the next page, at 5:30 the PAM ASC thermal check predeploy can be deleted because it, they got all the data they needed at 3:30. Over.

SPACECRAFT Okay, we copy.

SPACECRAFT Challenger.

CAPCOM Challenger, Houston,

SPACECRAFT Roger, we've got the ML step one completed at MET 0/400.

CAPCOM Roger, we copy that 4, 0, 0. Challenger Houston?
Go ahead, Mary.

Roger, we'd like to find out how your aft controller checkout went.

Aft controller checkout was fine, Mary.

Okay, thanks.

Challenger, Houston, we're 30 seconds LOS, we'll talk to you again through Hawaii at T + 29.

Okay Mary, we'll see you in Hawaii.

This is Mission Control Houston, at 4 hours 24 minutes, mission elapsed time. The outgoing Flight Director, Gary Coen has left the Control Center and is on his way to building 2 right now where the change-of-shift press conference will be conducted on time at 11:30 a.m. central time. We'll acquire signal again momentarily, let's see in 5 minutes through Hawaii. During the Guam pass the ground asked the crew to verify that the aft controllers checks went okay, that's an activity that's in the post-insertion checklist, which verifies the validity of the rotational handcontroller located on the aft flight deck. And the crew affirmed that that check was performed and that the controller functioned nominally. And the crew activity plan shows that in the next few minutes, the crew will begin its first meal in space and accordingly we expect to not have a lot of dialogue through this Hawaii pass --

END OF TAPE
PAO

- next few minutes the crew will begin its first meal in space and accordingly we expect to not have a lot of dialogue through this Hawaii pass and the TDRS pass so that the Flight Director's Change-of-Shift Briefing should be, should occur at a time that does not conflict with any significant activity onboard the vehicle. Mission elapsed time 4 hours, 25 minutes. This is Mission Control, Houston.

CAPCOM

Challenger, Houston with you through Hawaii for 8 minutes.

SPACECRAFT

Hello, Houston. We've got you through Hawaii with a squeal in the background.

CAPCOM

Challenger, Houston. We got you loud and clear.

CAPCOM

And Challenger, Houston. The squeal is probably due to our uplink of a teleprinter message. We're sending you a test message if you want to check it after we get it up there.

SPACECRAFT

Houston, Challenger.

CAPCOM

Challenger, Houston.

SPACECRAFT

Okay, we'd like to explain that we have not as of yet hooked up the teleprinter. Reason is that MS panel is hooked up to receive deploy audio for the VTR and we haven't quite gotten around to realigning all of our comm units so that we can devote one unit to the teleprinter, or one plug in to the teleprinter which would have to be the PS station.

CAPCOM

Challenger, Houston. No problem with that at all. We just want to make sure we can check it out before you hit the sack tonight.

SPACECRAFT

Yes. We'd much rather, if you don't mind, we'd rather leave the comm configuration the way it is until after the deployment and then in the presleep set up for the teleprinter.

CAPCOM

Roger, we concur with that.

CAPCOM

Challenger, Houston.

SPACECRAFT

Go ahead, Mary.

CAPCOM

Roger. This next TDRS pass we'd like to check out the encrypted mode. Therefore, when you're ready, it doesn't have to necessarily be LOS. We're just going to lose you for a couple of minutes here. We'd like you to go to ALL, take your encryption selection switch to transmit/receive and we'll pick you up encrypted through TDRS.
STS-41-B AIR/GROUND TRANSCRIPT t24j 034:17:25 2/3/84 PAGE 2

SPACECRAFT Okay, Mary. I'll take care of that. Is that okay to do now. (Garble).

CAPCOM Roger, we'll have immediate LOS when you do that but we only have a 2-minute drop until we pick you up TDRS.

SPACECRAFT Okay, I'll go up and get it.

PAO This is Mission Control, Houston. Just a momentary LOS period as we go from the Hawaii Earth station to TDRS. Mission elapsed time is 4 days, 4 hours rather. Mission elapsed time 4 hours, 37 minutes.

CAPCOM Challenger, Houston. We're 8 seconds LOS. We'll drop you for 2 minutes then up through TDRS.

SPACECRAFT Okay, Houston. We copy.

CAPCOM Challenger, Houston. With you through TDRS for 50 minutes.

SPACECRAFT Houston, we hear you through TDRS but you're very broken.

CAPCOM Roger, we copy that and you're loud and clear.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Houston.

CAPCOM Challenger, Houston. We're going to be troubleshooting that camera delta problem and so be advised we're going to be moving the cameras around.

SPACECRAFT Okay, understand.

PAO This is Mission Control, Houston, at 5 hours, 2 minutes mission elapsed time. Not very much air-to-ground presently because, of course, it is meal time onboard the Challenger right now. INCO is troubleshooting the delta camera presently. The image, or the picture provided by that camera is black and white affirming the concern that the colorwheel was malfunctioning. It, of course, is supposed to be a color camera but we're getting only a black and white image from it. The tilt mechanism is still inoperative and pan operations appear to be slower than nominal. In using aft cameras, the INCO is visually inspecting that delta camera presently - seeing if there's some - END OF TAPE
PAO And using aft camera the INCO is visually inspecting that delta camera presently, seeing if there's some, seeing if there's some action that might be taken to recover full capability with that unit. Mission elapsed time 5 hours 3 minutes, this is Mission Control Houston.

PAO This is Mission Control Houston, the INCO has just restated to the Flight Director the nature of the problem associated with delta camera, affirmed that the delta camera will not tilt, that pan operations are slower than nominal, and that the camera appears to hang up at various points, one panning, the color wheel does not run. They took a closer look using the alpha camera, to make a closeup inspection of a delta camera, its mount and cables, initial visual check didn't reveal any obvious discrepancy in that harness or cables, but, some of the backroom people will be taking a closer look at that, those pictures, to see if they can determine what might be causing that problem. They are now discussing whether cycling the circuit breaker that controls the tilt motor might have the effect of resetting that logic, and might be useful in recovering that function. Mission elapsed time is 5 hours 11 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM Roger, we're still working your camera delta problem, and would like to get some help from you, as it stands now there's no color, limited pan ability, and no tilt, so we're going to be troubleshooting it again --

SPACECRAFT Mary, please repeat.

CAPCOM Roger, we have at this time on camera delta, no color, limited pan, and no tilt, we'd like you to help us out by cycling a circuit breaker on R15 Echo.

SPACECRAFT Okay, standby.

CAPCOM Roger and on R15 Echo, that's circuit breaker camera delta pan tilt, we'd like you to open it for 30 seconds and then close it.

SPACECRAFT Okay, that's camera delta, camera pan tilt, I'll open it for 30 seconds and then close it.

CAPCOM That's affirmative.

SPACECRAFT Okay, it's opened.
CAPCOM We copy.

SPACECRAFT And it's closed.

CAPCOM We copy, thanks for the help. Also we might be dropping out early. As it is now we're 7 + 30 to LOS TDRS. In case we do lose lock earlier, we'd like to remind you that when we go TDRS LOS you're to go back to panel ALL and take your encryption selection switch to bypass, and that way we'll be able to get you at Guam at 5 + 51.

SPACECRAFT Okay, understand go from transmit receive to bypass at LOS.

CAPCOM That's affirmative.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Okay, Mary, we're still holding on the APU pump valve cooling for your call, and the APU heater gas generator pump, 3 switches going to A auto at 5:30, do you want us to hold off on that?

CAPCOM We'll check on that for you.

END OF TAPE
CAPCOM: We'll check on that for you. And Challenger, Houston. Hoot, if you do happen to get an alarm on water tank delta, you can disregard.

SPACECRAFT: Go ahead, Houston.

CAPCOM: Challenger, Houston, if you do get an alarm on water tank bravo, you can disregard, it's decreasing due to FHS usage, the quantity and we're going to change TIMBU on it.

SPACECRAFT: Ok, we copy that.

CAPCOM: And Challenger, Houston, on your APU question.

SPACECRAFT: Go ahead, Mary.

CAPCOM: Roger, Hoot, you're to delay all of that APU switch work until we call you, we will call you later.

SPACECRAFT: Ok, sounds good, Mary, thank you.

CAPCOM: Welcome.

PAO: This Mission Control Houston, we're LOS through T&R&S and we'll acquire in 20 minutes through Guam. Mission Elapsed Time 5 hours, 32 minutes.

CAPCOM: Challenger, Houston with you through Guam for 7-1/2 minutes.

SPACECRAFT: Roger, Houston, loud and clear.

CAPCOM: Got you loud and clear too, Vance, and have your peg 7 targets ready for uplink and also have a deploy pad and sep pad when you're ready to copy.

SPACECRAFT: Stand by one.

CAPCOM: We're standing by.

SPACECRAFT: Ok, Mary, we're ready to copy.

CAPCOM: Ok, Vance, have a deploy pad ready for a Westar 6 delta deploy.

SPACECRAFT: Roger.
CAPCOM       Deploy time 000/07:58:53. 034/20:58:53, plus 03 013 133. Deploy attitude, 012.11, 166.00, 289.07. Read back.

SPACECRAFT   Ok, Mary, we copied Westar, orbit 60, time 00/07:58:53. 034/20:58:53, plus 03 013 133, 012.11, 166.00, 289.07, over.

CAPCOM       That's a good read back and standing by with your sep pad when you're ready to copy.

SPACECRAFT   Ok, we're ready to copy, Mary.

CAPCOM       Ok, Hoot, for your Westar deploy you will be with sep with a right OMS burn, ITEM 3, TV roll 180. Negative 0.1, +5.2, -5.1, wait 226707. TIG 0/08:13:53.0. Peg 7 targets +0010.6, plus all balls, -003.0. Burn attitude 020 121 355, 0011.0, with a TGO of 00:13. VGO X +0010.38, -002.21 +002.96 with an apogee of 171, perigee +166. For your OMS helium reg test, alpha open, bravo closed and no RCS down mode. Read back.

END OF TAPE
Okay, Mary we copy, right OMS burn TV roll 180, minus 0 decimal 1, + 5 decimal 2, minus 5 decimal 1, 226707, Tiq at 0/08:13:53.0, +0010 decimal 6, all balls, minus 003 decimal 0. Attitude is 020, 121, 355, Delta V (garble) 0011 decimal 0, 00:13, +0010 decimal 38, minus 002 decimal 21, plus 002 decimal 96, 171 by 166, Alfa open, Bravo closed, no RCS down mode.

That's a good readback on your Sep pad.

Challenger Houston, you're 30 seconds LOS, we'll talk to you again through Hawaii, 6 + 06.

Okay, fine.

Mission Control Houston, we've lost signal through Guam, and we'll acquire in 5 minutes, through Hawaii the data uplinked during that Guam pass was preliminary advisory data pads to be recorded in the general purpose computers in preparation for the deploy of Westar which should occur in 1 rev from now. Mission elapsed time is 6 hours 1 minute, this is Mission Control Houston.

Challenger, Houston, with you through Hawaii for about 8 minutes.

Okay, Houston, loud and clear, we just talked over the deploy run, they gave us a briefing and so we're, everything looks caught up here.

Roger, we copy, that sounds good, we've got a couple notes for you when you are ready to copy.

Go ahead.

First of all we're sending up the TMBU now, for the ID and deploy time for you. And then we have a note on your 16 millimeter DAC camera.

Go ahead.

Roger, the small, all the small magazines, film magazines for that camera, the ASA 400 have been loaded with a thin base ASA 400 film and that extends the film run time from 3 point five minutes and it was previously 2 point five minutes, so unfortunately your photo TV checklist for the interior scenes show incorrect run times, but you can get the correct run time by going by the decals on the film magazines.

Okay, well it looks like we're conservative, we have a little more film, so that's noted.
CAPCOM    Roger, it was a change in the right direction, it appears to be. Also have the actions on the APU that were delayed earlier if you wanted to get your CAP, page 4-2, 4-3.

SPACECRAFT  Okay, go ahead, Mary.

CAPCOM    Roger, Hooter. That first action on MCCQ on 4-2 the actions on panel R2 are go at this time, and down on page 4-3, we have one change for that switch actions on panel A12, we would like you to do those now also, but make the delta that A12, APU heater gas generator fuel pump 3 should go to bravo auto, over.

SPACECRAFT  Okay, we copy that Mary, the pump valve tool can go back to off, and (garble) step on 4-2, the one on 4-3 you want us to take the APU heater gas generator fuel pump, all three of them to B auto.

CAPCOM    That's a good readback.

END OF TAPE
SPACECRAFT: Ok, we copy that, Mary, the pump valves cool, can go back to off, and (garble) step 4-2, the one on 4-3 you want us to take the APU heater gas generator fuel pump, all 3 of them to B auto.

CAPCOM: That's a good read back. Challenger, Houston, we're about 40 seconds LOS from Hawaii here, we'll pick you up in a couple of minutes through TDRS, do not configure for encrypted, we're going to suspend that until we call you back.

SPACECRAFT: Mary, we have a back ground noise, we know you said something, we can't hear you, it sounds like somebody is running an electric shaver on the net.

CAPCOM: Challenger, Houston, no, I'm not shaving, and we would not like you configure encrypted, we will pick you up in 2 minutes through TDRS straight.

SPACECRAFT: Ok, I understand, no encrypted.

CAPCOM: That's affirmative, talk to you in a couple.

SPACECRAFT: And Houston, this is Challenger, how do you read?

CAPCOM: Challenger, Houston, loud and clear through TDRS. Challenger, Houston, read you loud and clear through TDRS. Challenger, Houston, with you through TDRS for 50 minutes.

SPACECRAFT: Ok, Mary, read you loud and clear, how do you read us?

CAPCOM: Got you loud and clear too, Bruce.

SPACECRAFT: Ok, on the cinema 360 gas can out of the payload bay, it works like the thermal blanket has come partially unvelcroed on it on the inboard side. That is, it's a blanket that's wrapped all the way around the can circum-(garble), down at the bottom it meets and then it's just like you're opening the lapel on a coat or a jacket. You can see a wire bundle hanging out and the blanket is open, I guess it's a length of about 8 or 9 inches of it, to where you can call hinge point. We can't tell exactly how serious it is, but it looks like there may be some sort of a thermal leak there.

CAPCOM: Roger, we copy that.

SPACECRAFT: We can send you some TV of it at your pleasure.

CAPCOM: Roger, Bruce, that's a good idea, we'd like to do that, but we've got to wait till we get Ku-band acquisition.

SPACECRAFT: Roger, we copy.
PAO       This is Mission Control Houston, Cinema 360 is the
hemispheric projection film that is being carried onboard and
Mission Specialist Bruce McCandless indicating some concern over
the configuration with thermal blanket in the vicinity of that
machine as it is exposed from the get-away special cannister and
the Flight Director and INCO have discussed and affirmed their
plan to take a look at the movie camera when we have got K-band
acquisition through TDRS in a few minutes. Mission Elapsed Time
is 6 hours, 19 minutes and Challenger on the 5th orbit of the
Earth, and we will have Ku-band momentarily. Ku-band picture
coming momentarily and it will be on NASA select through the
ground station at Hawaii has recovered TV capability and reports
the ability to provide a picture which they characterize as being
in a fair quality. It looks like we have a lock on Ku-band and
we'll get TV in just a few seconds.

CAPCOM    Challenger, Houston, back with you through TDRS and
through Ku.

SPACECRAFT Ok, loud and clear, Mary.

CAPCOM    And now we have already sent up a new state vector
for you. And Challenger, Houston --

END OF TAPE
PAO  -- and we'll get TV in just a few seconds.

CAPCOM  Challenger, Houston, back with you through TDRS and through Ku.

SPACECRAFT  Okay, loud and clear, Mary.

CAPCOM  And we have already sent up a new state vector for you.

CAPCOM  And Challenger, Houston. Bruce --

SPACECRAFT  Okay, copy.

CAPCOM  Bruce, we're ready to take your TV whenever you're ready.

PAO  This is Mission --

SPACECRAFT  Okay, you should have it now, Mary.

PAO  This is Mission Control. This picture --

CAPCOM  Thank you and we're getting a good picture of here and I can see what you were talking about.

PAO  This picture from the alpha camera located on the port forward bulkhead.

SPACECRAFT  Okay, I'll zoom in for you.

SPACECRAFT  Mary, the possibility is, if there's no harm done between now and the EVAs we could probably velcro it back up but that time it looks like it's just a velcro closure for your consideration, over.

CAPCOM  Roger Bruce. We'll look into that for you.

SPACECRAFT  And Mary, if you'd like we'll give you a pan on the rest of the bay. We think everything looks pretty normal other than the can having the blanket loose.

CAPCOM  Roger, Vance. Go ahead. We'd like to see that. Looking good so far.

PAO  This is Mission Control. The Payloads Officer reports conjecture right now is that that loose thermal blanket is not going to endanger the Cinema 360 payload in any regard. The Shuttle Pallet Satellite in the center of the picture now and the Payload Assist Module directly behind it and along the upper right portion of the screen the remote manipulator system and its shoulder joint now appearing fully in the picture.
CAPCOM Challenger, Houston. As you finish up panning the payload bay we'd like to take one more look at the 360 if you would.

SPACECRAFT Okay, Mary. We'll get back there to you.

CAPCOM Copy.

PAO The alpha camera now being controlled by Astronaut Bruce McCandless. And plan is to attempt another picture we will take with the delta camera which will be the first utility of that instrument since we cycled the circuit breaker on it on the last rev.

CAPCOM Challenger, Houston. We're getting a real good picture of the GAS can now and as soon as you're finished showing us everything you want to show us in the payload bay, INCO would like to take control of the cameras back and keep troubleshooting the problems on camera delta.

SPACECRAFT Okay, yes, we're just about through here. We'll give it to you in a minute.

CAPCOM Okay, thanks a lot. The TV shots really help.

SPACECRAFT Okay, it's all yours.

CAPCOM Thank you, we copy that.

PAO This is Mission Control. Cameras now under the control of INCO here in the Control Center. The Manned Maneuvering Unit now visible in the picture, of course, in its stowed position along the starboard bulkhead. And at the top of the screen camera delta as being photographed by camera alpha.

PAO This is Mission Control, Houston. This is the delta camera and clearly it's still providing only a black and white image. The kind of half moon affect that darkens the upper 1/2 of the picture is a product of the inoperative colorwheel in that camera which is obscuring the upper quadrant of that lens. So initially it would appear that having cycled the circuit breaker on the last rev has had no effect at least on the colorwheel and we'll stand by to see what's happened to the tilt and pan mechanism.

END OF TAPE
PAO       - - would appear that having cycled the circuit
breaker on the last rev has had no affect at least on the color
wheel, and we'll stand by to see what's happened to the tilt and
pan mechanism.

PAO       Mission Control Houston, the INCO has put the
camera through its range of functions, still getting no tilt, pan
is still inhibited, and intermittent and the zoom function
appears to be unaffected as you can see no color. Delta camera
looking across the payload bay to the starboard side at the
remote manipulator system with the shuttle pallet satellite in
the left corner of the screen. These scenes being provided by
the camera C on the port side of the aft, or the aft bulkhead,
and some fairly extreme close up views of the payload assist
modular we showed earlier and this view being of the Orbiter's
wing panel. And correction, camera C is on the starboard aft
bulkhead. The Earth views now show South American continent -
This is the alpha camera once again. This is Mission Control
Houston, the downlink TV's been concluded, the Challenger now
crossing the east coast of South America and the fifth orbit of
the Earth at mission elapsed time 6 hours 44 minutes.

CAPCOM    Challenger, Houston.

SPACECRAFT Go ahead, Mary, this is Challenger.

CAPCOM    Roger, got an action on the circuit breakers down
on the middeck, MA73 Charlie row Echo when you are ready.

SPACECRAFT Okay, Mary, MA73 Charlie row C.

CAPCOM    On row Echo, because you're not using fan sep 1
we'd like to disable that ac current into it, all three phases,
so we'd like you to open circuit breakers ac 1, WCS fan sep 1,
phase A, phase B and phase C, three of them open.

SPACECRAFT Okay, Mary, they are all open, WCS fans sep 1, all
three phases.

CAPCOM    Okay, thanks a lot.

PAO       This is Mission Control Houston, at 6 hours 55
minutes, mission elapsed time, the crew now in the PAM deploy
checklist, in preparation for deployment at Westar B.

SPACECRAFT Houston, Challenger.

CAPCOM    Challenger, Houston

SPACECRAFT Mary, you feel like watching a gimbal check?

CAPCOM    Roger, we're standing by for your gimbal check.
Okay, here it comes.

That check now in progress of the gimbal mechanism of the payload of this module.

Challenger Houston, we're about 10 minutes LOS on TDRS, maybe having some Comm dropout for these last 10 minutes, so just in case if we lose you we'll get you through Guam at 7 + 29.

Okay, Mary.

This is Mission Control Houston, at 6 hours, 58 minutes, drop out in Comm expected as we kind of go over the hill from TDRS and the vehicle attitude on contributing to optimum signal strength as a by product of the antenna location and pointing. We're now 1 hour from payload deploy and the Mission Control team here recognizing some keystrokes and commands that the crew is performing in preparation for those deploy activities. For the deploy — —

END OF TAPE
PAO      -- and as a by-produce of the antenna location and pointing. We're now 1 hour from payload deploy and the Mission Control Team here recognizing some keystrokes and commands that the crew is performing in preparation for those deploy activities. For the deploy, the crew will be located as follows. Mission Commander Vance Brand will be at the aft starboard station in the flight deck from where he can control the Orbiter's attitude with the rotational hand controller. Pilot Hoot Gibson will be in the forward right seat. MS-1 which is Ron McNair will be in the forward left seat, and MS-2 Bob Stewart will be at the aft crew station with Vance Brand. Stewart will be at the aft port or the payload station. Mission Specialist Bruce McCandless will be in the flight or in the mid deck of the Orbiter and will not be performing activities associated with the payload deployment, but in fact will be working on student experiments. This is Mission Control Houston, Mission Elapsed Time of 7 hours, 1 minute. The gimbal check proved nominal. Mission Specialist Bob Stewart is performing sequence control assembly power up and also making a backup check of the sequence.

CAPCOM    Challenger, Houston.

SPACECRAFT   Houston.

CAPCOM    Roger, Challenger, Hooter, that gimbal check looked real good to us.

SPACECRAFT   Ok, thank you, Houston.

PAO      To continue, Bob Stewart is also making a backup check on the sequence control assembly that is associated with the payload assist module. That CRT-3, in the commander's seat of the flight deck, Mission Specialist Ron McNair will be making some keystrokes preparing the vehicle's computer system for the deployment activity. The deployment, of course, is a sequence that is affected by those 4 crewmen working in concert together rather than any one member of the crew. Payloads Officer advising the Flight Director that they've been watching Bob Stewart perform the check out of the sequence control assembly and all those functions and temperatures looked very good. The end of deploy procedures officer in the Mission Control Center has reported to the Flight Director that the pre-deploy checkout operations are proceeding on schedule and that the data shows approximately where they are in the PAM-deploy checklist, and for those of you following along in that document, they're on pages 3-8 and 3-9 and holding. This is Mission Control Houston, it's 7 hours, 8 minutes, Mission Elapsed Time, we're LOS through TDRS, 50 minutes from deployment of, scheduled deployment of Westar at about 10 minutes from now, the pilot Hoot Gibson will be at his position on the starboard, forward seat in the flight deck. He'll be making some keystrokes inserting commands in the digital
auto-pilot onboard the vehicle and the pilot and the commander will then configure the cabin light for TV to facilitate optimum viewing of the deployment sequence on the video tape process. At 25 minutes before the deployment there will be some critical temperature checks made of the payload assist module and the payload bay flood lights will be configured for the TV recording.

END OF TAPE
PAO --video tape process. At 25 minutes before the deployment, there will be some critical temperature checks made of the payload assist module. And the payload bay floodlights will be configured for the tv recording of the deployment process. And again we do expect to get tv through Hawaii but the quality of that video is suspect at this point. This is Mission Control Houston, at 7 hours, 19 minutes, Mission Elapsed Time, were now 40 minutes from that deployment and according to the timeline we'd be picking up activities once again on the deployment checklist. We've had some keystrokes principally by Pilot Hoot Gibson at this time, but in as much as were in the blind why we will have to wait until we acquire at Guam to verify that adequacy of preparations up to this point. Mission Elapsed Time 7 hours, 19 minutes, and we'll acquire through Guam in 10 minutes, this is Mission Control Houston.

PAO This is Mission Control Houston, at 7 hours, 28 minutes, Mission Elapsed Time, 2 minutes away from AOS through Guam, and we'll be able to determine the success of predeploy preparations up to this point and are probably going to give a reminder to the crew that we will be taking television through Hawaii during for that 8 minute duration over the islands, and watch predeploy checkout activities on NASA select. This deploy will be the 6th use of payload assist module deployment on Space Shuttle, 2 on STS-5 for the Satellite Business System and ANIC, on STS-7 an ANIC and a Palapa, and on STS-8 and INSAT 1B. So Westar will be the sixth in that series, of course, all prior to previous ones have been nominal and in addition to these of course, there have been a little series of 10 or so PAM deployments they used on delta vehicles dating back to 1980, on the unmanned side of the house. Should be getting voice momentarily through Guam, and get the crews report on status of deployment preparations. At Mission Elapsed Time 7 hours, 29 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, with you through Guam for 5 minutes.

SPACECRAFT Got you loud and clear.

CAPCOM Got you loud and clear too, and don't have anything for you.

SPACECRAFT (garble)

SPACECRAFT And we are just arriving in the deploy attitude and everything is going just per the book.

CAPCOM Sounds real good to us.

PAO Mission Control Houston, the Challenger will be at a -ZLV attitude for deployment.
PAO: We're 27 minutes away from deployment. Payloads reports nominal PAM data. And Commander should soon be activating payload bay floodlights to prepare for visual verification of predeployment operations. And Mission Specialist Ron McNair, at approximately this time will be checking the batteries aboard Westar which of course had been supplemented by Orbiter power and assuring they are in a fully charged state by deployment. And Mission Specialist Bob Stewart will be deactivating the PAM heaters on the airborne support equipment. And at this point verification has been made of, concerning the deploy configuration, the IMU's has been aligned prior to the start of deployment ---

END OF TAPE
PAO And at this point verification is being made of, concerning the deploy configuration, the IMU's have been aligned prior to the start of the deployment checkout. The deploy and separation, the pads, their preliminary advisory data have been voiced up, the deploy time in Greenwich Mean Time has been set in the General Purpose Computers by a table maintenance buffer update from the ground. TV cameras and motion picture cameras have been configured, closed circuit TV's have all been activated and positioned by now and the crew will have selected the best closed circuit camera for deployment monitoring.

CAPCOM Challenger, Houston, we're about 30 seconds LOS here at Guam, we'll talk to you through Hawaii at 7:42, and we'll be taking live TV there.

SPACECRAFT Ok, we'll see you then, and we'll have some TV for you.

PAO This is Mission Control Houston, we're LOS, we'll acquire at Hawaii in about 7 minutes. Mission Elapsed Time at 7 hours, 34 minutes, and we're just less than 25 minutes from deployment. We expect TV through Hawaii, and the expectation is that the crew will select camera alpha to monitor the deployment. Cassettes, video cassettes will have been installed in the video tape recorders onboard. 70-mm Hasselblad is mounted in the aft starboard window, and its proper exposure settings to record the deployment. A 16-mm motion picture camera is also mounted in the aft window and another 16-mm will be hand held by Bob Stewart for photography of the deployment out the overhead windows, and the Cinema 360 camera, there are 2 carried onboard one in the get-away special cannister in the payload bay, and another in the flight deck. And the flight deck camera will have been mounted on a panel for in-cabin scenes during this deployment, and window shades will have been removed and stowed by this point. We're 22 minutes from deployment, and the pre-deploy sequences begin in earnest at about 15 minutes. Ron McNair executes an ITEM 2 on the Cathode Ray Tube Displays in the commanders seat onboard the vehicle, that sequence, that execute has the effect of starting the sequence. The sunshields which have been closed to this point will open. Restraints will be removed from the payload assist module, and spinup will occur, a nominal spinup of 50 revolutions per seconds is considered is to be the objective, of course, and the speed will be monitored to be sure there are no over speeds or under speeds. This is Mission Control Houston, at 7 hours, 40 minutes, we're just a 1-1/2 minutes away from Acquisition Of Signal through Hawaii, 18 minutes remaining to deployment, and shortly after AOS, Mission Specialist Dr. Ron McNair will perform that ITEM 2 execute commanding the mechanical sequence of the initial deployment activities including opening of the sunshield and spinup of the stabilizing mechanism at a rate of 50 revolutions per minute. TV pass AOS through Hawaii will be for slightly more than 8
minutes in duration and will not give us a visual coverage of the deployment. Mission Elapsed Time is 7 hours, 41 minutes and we'll have voice in just a few moments through the ground station in Hawaii.

END OF TAPE
PAO  -- few moments through the ground station at Hawaii.

CAPCOM  Challenger, Houston. Have you through Hawaii for 8 minutes.

SPACECRAFT  Okay, Mary. We copy you loud and clear.

CAPCOM  You're loud and clear too.

CAPCOM  And we've got a good live shot of your payload bay right now.

PAO  Mission Control. The Payloads Officer has verified that safety inhibits are in place and the foreground of the photograph in the picture now is Challenger Pilot Hoot Gibson and in the background Mission Specialist Dr. Ron McNair. In 50 seconds Dr. McNair will perform an item 1 execute which will have the affect of opening the sunshield on those payload bay, on the payload assist module and begin the spinup activities. Safety restraints are presently affirm to be in by the Payloads Officer in the Control Center. That item 2 execute will remove those restraints so we'll be looking for verification that the sunshield has opened, that the restraints have been removed and that spinup has commenced and affirmation of the spinup of 50 revolutions per minute.

SPACECRAFT  Okay, Mary. We're starting mechanical sequence.

CAPCOM  We see that, thanks.

PAO  Data verifies that the sunshield sequence is commenced. And sunshields now open exposing the Westar satellite. Spinup will commence momentarily.

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead, Houston.

CAPCOM  Roger, whenever you can get around to it, no rush, we'd like you to check in your deploy checklist page 3-9. On panel A7 you, that you have your floodlights configured properly minus 25 minutes.

SPACECRAFT  That's affirmative, Houston. We got those on at 25 minutes.

CAPCOM  We copy that.

SPACECRAFT  Mary, both restraints are off and (garble) spinup's in progress.
CAPCOM  Copy that, thanks.

PAO  Dr. McNair affirms that the restraints have been removed and that spinup is in progress. RPM's now 31, 31 RPM and climbing to 40, 41, 45. 50 RPM's and holding. 51, 52 RPM's. Back to 51. Spin rate's now stabilized at 50 revolutions per minute which is nominal. Airborne support equipment's been commanded on. We're 11 minutes from deployment. Final checkouts of the Westar systems are being made and verified making sure current levels are stable and adequate. Westar's on internal power and everything looks good onboard the ship. 11 minutes from deploy. At 3 minutes from deployment, Dr. McNair will initiate a terminal sequence start on cathode-ray tube or display unit number 1.

SPACECRAFT  -- internal power. Spin looks good. All, everything is completely nominal.

CAPCOM  Challenger, Houston, copy and concur.

PAO  Dr. McNair reporting nominal systems onboard Westar and on the Payload Assist Module. At 3 minutes before deployment, Dr. McNair will command a terminal sequence start which will have the affect of prearming the ordinance that frees Westar from the Payload Assist Module or from the Payload Bay. CAPCOM's going to give a go for deploy momentarily.

CAPCOM  Challenger, Houston. At this time Westar is go for deploy.

SPACECRAFT  Roger, we're go for deploy.

PAO  Mission Specialist Bob Stewart at the aft crew station will arm the Payload Assist Module at a minute and 30 seconds before deployment and at 25 seconds before deployment Dr. --

END OF TAPE
Mission Specialist, Bob Stewart at the aft crew station will arm the payload assist module at a minute and 30 seconds before deployment and at 25 seconds before deployment, Dr. McNair, will perform what's termed an item 9 execute which will be the final command sent to the satellite before deployment, and initiate the deploy sequence.

Challenger, Houston, we're about 30 seconds LOS here Hawaii, we will lose you for a couple of minutes and then pick you up through TDRS.

Okay, Houston, see you shortly.

Mission Specialist Bob Stewart is visible in the picture for a moment between Hoot Gibson and Ron McNair.

Spin rate on Westar continues to be a perfect 50 RPM and temperatures look good all around the module. This is Mission Control Houston, the Payload Operations Center verified that it had locked on to it's telemetry stream from Westar and that all the data was precise and looked quite good from there standpoint, so all indications to this point seem to suggest we have a nominal and on time deployment of Westar in 7 minutes 44 seconds from now. Mission elapsed time presently 7 hours 51 minutes. Now standing by for AOS through TDRS.

Challenger, Houston, with you through TDRS for 50 minutes.

Say again, Mary.

Howdy, Challenger, this is Houston with you through TDRS.

Roger, we copy, Houston.

This is Mission Control Houston, the spin rate temperatures and current levels on board the satellite and payload assist module all nominal. It's six minutes from deploy. This is Mission Control Houston, 5 minutes from deploy, data continues to look good, spin rate stable at 50 RPM's with temperatures and voltage current levels are nominal. 15 minutes after deployment, the Orbiter will perform a separation burn to move it away from the Westar satellite and Westar's perigee kick motor will fire at - time of Mission elapsed time of 8 hours 45 minutes, will be the first burn of the Westar perigee kick motor. Mission elapsed time 7 hours, 55 minutes, in less than a minute now, from now, Ron McNair and Bob Stewart will initiate some keystrokes which will be the final commands transmitted to Westar in final preparation for deployment.
CAPCOM We're negative reporting from here on out, you have a final Westar go for deploy.

SPACERFRAFT Okay, we copy, go for deploy. Everything looks good.

PAO Now 20 seconds from the final keystroke. The predeploy checklist officer here in the Mission Control Center, verifying that those final commands are inputted and that we are on page 312 and 313 of the checklist at the right time and the right place. Two minutes, 45 seconds from deploy. Spin rates, currents, temperatures, all data looks very good. This is Mission Control Houston, were 2 minutes from deployment, we'll get some data verification of deployment through some telemetry data that we are watching here in the Control Center, and shortly after that we'll get voice verification from the crew.

END OF TAPE
PAO: This is Mission Control, Houston. We're 2 minutes from deployment we'll get some data verification of deployment through some telemetry data that we're watching here in the Control Center and shortly after that we'll get voice verification from the crew. Deployment in a minute 30. We have some prearm and arm commands initiated by Ron McNair and Bob Stewart. One minute from deployment. Payloads Officer verifies that PAM and Payload are safed and armed. At 50 seconds from deployment, all the data continues to look good. Spin rate is stable. Currents, temperatures, voltage levels all nominal. Dr. McNair now initiating the final command to the onboard computers. Deployment in 20 seconds. 15 seconds. Data still looks good. 5 seconds till deployment. Payloads Officer reports a good deploy from the data.

SPACECRAFT: (Garble) be back with a report in a few minutes.

CAPCOM: Copy that and looks good to us.

PAO: Crew affirms good deploy.

PAO: This is Mission Control. We're now counting down to the OMS separation burn that Challenger will perform to remove it to a safe distance from the Westar and Payload Assist Module as the perigee kick motor is fired. That burn occurs at 13 minutes, 13 and 1/2 minutes from now.

SPACECRAFT: Houston, Challenger. We have the sunshield closed. We have 2 position indicators showing closed. Number 1 and 2 but we have a visual confirmation that sunshield closed.

CAPCOM: Copy that and we see that data.

PAO: Mission Control, Houston. NASA Select will provide playback of Westar predeploy activities in 4 minutes from now at 8:05 mission elapsed time. We're 12 and 1/2 minutes away from the OMS separation burn. Data shows that the sunshields have closed again as they are required to do after deployment. Payloads Officer reports all airborne support equipment is powered down and its configuration is nominal.

SPACECRAFT: Houston, Challenger.

CAPCOM: Challenger, Houston.

SPACECRAFT: Roger, Mary. Tell all those Westar folks they really have a pretty bird heading out, be heading into geosynchronous orbit pretty soon. We have about 10 eyeballs and 5 noses all at the window looking.

CAPCOM: Copy that.
And Mary, ready to give you some numbers on that deploy when you're ready.

We're ready to copy, Ron.

Okay, the current attitude was roll 12.09, pitch 166.02, yaw 289.05. The rates: roll 0, pitch -.002, yaw +.001, over.

Copy that. Sounds good.

This is Mission Control, Houston. We're 9 minutes away from the OMS separation burn and Guidance Navigation and Control Officer here reports ship's in a good attitude for that burn.

This is Mission Control, Houston, at 8 hours, 10 minutes mission elapsed time. 3 and 1/2 minutes away from the ignition of the OMS separation maneuver. The earlier air-to-ground, Dr. Ron McNair reporting the vehicle attitude roll rates and mission elapsed time of the deployment sequence. Mission Commander Vance Brand reporting, reporting that there were 10 eyeballs and 5 noses pressed against the window at the aft crew station watching the deployment activity.

END OF TAPE
PAO    Vance Brand reporting of the - reporting that there were 10 eyeballs and 5 noses pressed against the windows at the aft crew station watching deployment activities. This is Mission Control Houston, we're 1 minute 15 seconds away from ignition the OMS separation burn and the propulsion shift system officer has reported to the Flight Director that we're in good configuration for that burn which is now 1 minute away. 20 seconds away from ignition, 15, 10 seconds, 5, prop affirms ignition. Prop reports good data on the OMS burn, and guidance reports that the OMS was 2/10ths of a foot per second within nominal.

SPACECRAFT    Houston, Challenger, are you ready to watch a gimbal check.

CAPCOM    Challenger, Houston, we're ready to monitor a gimbal check.

PAO    This is Mission Control Houston, at 8 hours 17 minutes, mission elapsed time next to significant event to look forward to is the firing of the perigee kick motor on board the payload assist module, on carrying Westar on up towards geosync that to occur at mission elapsed time of 8 hours, 45 minutes, and we'll stand by for a verification of that burn, and measurement of its adequacy will be reported to us by the payload operations center.

CAPCOM    Challenger, Houston.

SPACECRAFT    Go ahead, Houston.

CAPCOM    Houston - Challenger, Houston, we'd like to request that you rerun your primary gimbal check.

SPACECRAFT    Okay.

CAPCOM    Challenger, Houston, we just missed the data and we'd like to take a look at it for the first time.

PAO    This is Mission Control, that cue, that call for another gimbal check doesn't indicate a problem, the first gimbal check wasn't recorded, no data was available on it, and they do want to get a look at some gimbal check data so they are asking that that be reinitiate it. Mission elapsed time 8 hours 20 minutes, this is Mission Control Houston.

CAPCOM    Challenger, Houston.

CAPCOM    Challenger, Houston.

SPACECRAFT    Houston, Challenger, go ahead.
CAPCOM   Roger, Hoot, I have a couple of things for you, we're UHF through Botswana although we're about 11 minutes TDRS LOS might be losing you in and out here. So in case we do lose you we'll talk to you through Guam at 9 + 09, but have some business to finish up when you are ready to copy.

SPACECRAFT   Okay, Mary, we're ready to copy. Go ahead

CAPCOM   Roger, we'd just like to remind you that once you get settled in your window protection attitude that we would, and you have time, we'd like you to set up that teleprinter. You will not get a message number 1 when you are ready. We are going to delete the test message, so you will receive a message number 2 which is a block weather update, we owe you. We'd also like to check whether you had any problems with the connector on your AEM?

SPACECRAFT   We haven't checked that yet, Mary. Mary, check, did early during the post insertion and a couple of hours ago and the AEM seemed to be working fine.

CAPCOM   We copy that, are the lights out?

SPACECRAFT   Okay, Mary, I turned the lights off on schedule per the CAP, the system seems to be working fine, as you may recall the connector was taped to hold in place, and we have not disturbed the connector.

CAPCOM   Roger, we copy that, and that's good news, that's why we were concerned because of that a --

END OF TAPE
SPACECRAFT  -- for the CAP, the system seems to be working fine, as you may recall, the connector was taped to hold it in place and we had not disturbed the connector.

SPACECRAFT  Roger, we copy that, and that's good news, that's why we were concerned, because of that connector taping. Thanks. Challenger, Houston, we're about a minute LOS here through Botswana, and we'll talk to you again through Guam at 9:09, and Jerry will be up to talk to you then.

PAO      This is Mission Control Houston, it's 9 hours, 6 minutes Mission Elapsed Time, we're about a minute away for Acquisition of Signal through Guam, and the data shows the perigee kick-motor burn is in progress, and we'll stand by to get a report from the Payload Operations Control Center, on that.

CAPCOM  Challenger, Houston with you with a short pass at Guam.

SPACECRAFT  Hello, Houston, we've got you at Guam.

CAPCOM  Roger that, we have a very short pass, 8 minutes, we'll have you at Hawaii for a longer one. Just a reminder, we're expecting TV dump at Hawaii and also expecting a voice dub on it.

SPACECRAFT  Roger, Jerry. Ron's getting you set up for that.

CAPCOM  Roger that, thank you.

SPACECRAFT  How long is the pass?

CAPCOM  The Hawaii pass is about 7 minutes.

SPACECRAFT  Houston, this is Challenger, we're configured for teleprinter now, over.

CAPCOM  Roger, copy that Bruce, thank you.

SPACECRAFT  (Garble)

CAPCOM  Challenger, Houston, go ahead.

SPACECRAFT  Ok, control panel command, panel command, then power back on. Ok, (garble)

CAPCOM  Challenger, Houston, we've got a hot mike on the ground.

SPACECRAFT  Ok, OK, Jerry, we corrected the problem.

CAPCOM  Roger, copy, Ron, thank you.
PAO       This is Mission Control at 9 hours, 18 minutes, we'll have voice in a moment through Hawaii.

CAPCOM    Challenger, Houston with you through Hawaii for 7 minutes.

SPACECRAFT Ok, Jerry, read you loud and clear, going to send you a bit of TV, we'll be starting with the sunshield opening and we'll fast forward through some of the mechanical sequence and deploy.

CAPCOM    Ok, stand by, Ron, we still don't have data here on the ground.

SPACECRAFT Ok, we'll be standing by for your ready.

CAPCOM    Roger Ron, we'll give you call as soon as we get things straight.

END OF TAPE
CAPCOM  Roger, we'll give you a call as soon as we get things straight. Challenger, Houston, we're ready for a playback now.

CAPCOM  Roger, we're getting a good picture, and we're also getting your voice.

CAPCOM  That's affirmative, Challenger, we're still getting video and audio.

CAPCOM  Roger that Ron, we're 40 seconds LOS, next is TDRS in about 4 minutes.

SPACECRAFT  Great (garble). Spacecraft systems look good --
SPACECRAFT  Okay, (garble) spacecraft systems look good, spin stable. Oh, looks nice. (Garble). Standing by for minute and 30 and we'll hit those switches off at (garble). Okay.

CAPCOM  Challenger, Houston. Going over the hill. We'll see you in 4 minutes.

SPACECRAFT  Okay, Jerry. See you then.

PAO  This is Mission Control, Houston. We've lost signal through Hawaii. That downlinked video now complete. Narrated by Dr. Rob McNair and Dr. McNair reported that the westar made quite a thump when it leaped out of the sunshield, out of the payload bay doors, saying that it really got your attention when it left. We'll acquire through TDRS in approximately 3 minutes at mission elapsed time 9 hours, 26 minutes. This is Mission Control, Houston.

CAPCOM  Challenger, Houston. Back with you through TDRS.

SPACECRAFT  (Garble). Roger, Houston. We read you.

CAPCOM  Roger, Challenger. I've got one update to the CAP whenever you're ready and also be advised we'll be sending you a teleprinter message over Santiago at 09 plus 44.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Challenger.

SPACECRAFT  Jerry, we're getting a lot of static and we've been trying to chase it down up here by turning off wireless units. Are you receiving a lot of static from us?

CAPCOM  That's negative. You're coming through loud and clear.

SPACECRAFT  Houston, Challenger. There's so much static we couldn't hear if you answered.

CAPCOM  Roger, Vance. You are loud and clear. No static on the ground and can you tell us is it air-to-ground or is it only on board ICOM that you're getting the static.

SPACECRAFT  We're still chasing that down. We'll get back with you.

CAPCOM  Copy.

SPACECRAFT  Houston, Challenger. Comm check on air-to-ground.
CAPCOMRoger, Challenger. We got you loud and clear. I think we dropped out on TDRS for a short period.

SPACECRAFTOkay.

CAPCOMChallenger, Houston. We'll be handing over TDRS to Santiago in about a minute for a teleprinter message.

SPACECRAFTOkay, Houston. We copy that.

CAPCOMRoger.

CAPCOMChallenger, Houston with you through Santiago.

CAPCOMChallenger, Houston back with you through TDRS.

SPACECRAFTHouston, Challenger. Please repeat.

CAPCOMRoger. We couldn't get any valid uplinks at Santiago. We're back with you through TDRS. We'd like to have a GNC spec 1 so we can watch your COAS activities and also I have some words for Ron on activities after ASE temp check.

SPACECRAFTGo ahead, Jerry.

CAPCOMOkay, Challenger. For Ron. Ron, after you have completed the PALAPA ASE temp checks, we would like you to switch the PC MMU formats to 103 and 161.

END OF TAPE
CAPCOM: Okay, Challenger, for Ron, after you've completed the Palapa ASE temp checks, we'd like you to switch the PCMNU formats to 103 and 161.

SPACECRAFT: Okay Jerry, after the ASE temp checks, switch PCMNU formats 103 and 161.

CAPCOM: Roger that and Ron while your copying things down, for whoever is scheduled to do the activity, you can delete the supply H2O tank dump this evening.

SPACECRAFT: Okay, copy delete supply H2O tank dump. (garble)

SPACECRAFT: Houston, Challenger,

CAPCOM: Go ahead, Vance.

SPACECRAFT: Jerry, how did the PKM burn look?

CAPCOM: Well we've been standing by trying to get some confirmed information, the geometry right now has the antenna of the spacecraft pointing directly away from the ground base antenna, we are tracking two targets, we think everything is okay, but we're going to have to wait for geometry to get better, so we can get good data.

SPACECRAFT: Okay.

CAPCOM: And Challenger, Houston, you can have the spec l back.

SPACECRAFT: Copy.

SPACECRAFT: Okay Jerry, are you ready for the PAM thermal check?

CAPCOM: Roger, Ron, we're standing by.

SPACECRAFT: Okay, coming up. Okay Jerry, that thermal check is complete.

CAPCOM: Roger copy Ron, stand by one.

CAPCOM: And Challenger Houston, for Ron, we would like you to switch SCA go to number 1 so we can do some ASE temp checks with it also.

SPACECRAFT: Okay copy, you'd like that same check on SCA number 1?

CAPCOM: That's affirm, and Challenger be advised we're going to be handing over to Ascension here shortly expect a Comm
drop. We're going to try to get you a telexprinter message at ascention.

SPACECRAFT  Okay.
CAPCOM      Challenger, Houston, for Ron.
SPACECRAFT  Go ahead, Houston.
CAPCOM      Okay, the guys in the back have seen all they need to see, you can go ahead and terminate the ASE thermal checks.
SPACECRAFT  Okay, in work.
SPACECRAFT  And Houston, Houston, Challenger.
CAPCOM      Roger, Vance. go ahead we had a Comm drop.
SPACECRAFT  Okay, currently I'm performing the star a line, I'm torquing, it just completed. If you didn't see it, I will give you the data?
CAPCOM      Okay, Vance, we've got the data, thank you.
SPACECRAFT  Okay.
SPACECRAFT  Houston, Challenger,
CAPCOM      Go ahead, Vance
SPACECRAFT  Okay. In starting the star calibration, have two questions - one is, do you want the same attitude? Persume that's so although I don't think I have the (garble) star number and the, I'm not positive it's the same star number. The other thing is Ron is about ready to change PCMMU formats, do you want that to come after the COAS CAL?
CAPCOM      Okay, Vance, I will get you an answer on that PCMMU format changes, and I did not copy all of the first, you had a very deep echo, over.
SPACECRAFT  Okay, the first, I'm doing a COAS calibration having completed the IMU alignment, and should I use the same attitude as for the IMU alignment, it's a little sketchie in the CAP
CAPCOM      Okay, standby, I'll ask the PAO guys.
CAPCOM      Challenger, Houston for Vance.
SPACECRAFT  Go ahead.
CAPCOM          Okay, Vance, talking to the FAO's they would like
you to use the block there on page 4-4 entitled COAS calibration
log using the -Z and star number 12.

SPACECRAFT     Okay, thank you.

CAPCOM          Roger that, and for Ron, he's go to change the --

END OF TAPE
CAPCOM  -- dash 4, entitled COAS Calibration Log, using the -2 and star number 12.

SPACECRAFT  Ok, thank you.

CAPCOM  Roger that, and for Ron, he's go to change the PCMMU formats at TDRS LOS, which is about 15 minutes.

SPACECRAFT  Ok, copy. A final item, we just received -- there was no, nothing intelligible on it, appeared to be mostly, little rectangles standing on end, just wondered if that was intended or if somehow the message got garbled.

CAPCOM  Roger, that was not intended, we'll try again at Guam, and expect some dropouts here in the comm from here on, 14 minutes to LOS, next is Guam at 10:42.

SPACECRAFT  Ok.

CAPCOM  And Challenger, Houston, during the LOS, we would like you to check the teleprinter configuration per the cue card and make sure we're configured at Guam.

SPACECRAFT  Challenger, wilco, and one question. The cue card doesn't address whether the CCU power to which the teleprinter is plugged in should be on or off, it is off since that is the configuration that we remain in when disconnecting, over.

CAPCOM  Ok, Bruce, copy that, we'll try to get an answer before LOS. Challenger, Houston, for Bruce.

SPACECRAFT  Go ahead, Jerry.

CAPCOM  Ok, Bruce, that's affirm, the power should be off on the CCU that you're plugged into.

SPACECRAFT  Ok, that's the configuration we're in.

CAPCOM  Roger that.

SPACECRAFT  Houston, Challenger, over.

CAPCOM  Roger, go ahead, Bruce.

SPACECRAFT  Ok Jerry, I've rechecked the configuration for the teleprinter per page 2-11 in the orbit ops checklist, the only discrepancy we have is that if you look about 10 lines down the page there, it says all other audio panels configure for air-to-ground 2 receive, we interpreted that to be a misprint, since we don't want to be listening to air-to-ground 2 when you're sending a teleprinter message up, so we have the other audio panels in off and the teleprinter connected into the Payload Specialist
station as indicated at the top of the page, configuration wise, over.

CAPCOM  Roger, stand by, Bruce. Challenger, Houston, for Bruce.

SPACECRAFT  Roger, Jerry.

CAPCOM  Roger, Bruce, INCO says that configuration should be good. We'll try again at Guam and see how it works.

SPACECRAFT  Ok, thank you very much, we thought it would but in a spirit of soul searching we were just sort of trying to see if there was anything possible that was causing the problem.

CAPCOM  Roger, copy that. We're 7 minutes to LOS.

PAO  This is Mission Control Houston, we are just seconds away from Acquisition of Signal through Guam. Mission Elapsed Time is 10 hours, 42 minutes.

CAPCOM  Challenger, Houston, back with you through Guam for 6 minutes.

SPACECRAFT  Ok, Jerry, loud and clear.

CAPCOM  Ok, Vance, and we're going to be sending a teleprinter message again and if it doesn't work, we would like you to cycle the power off for 30 seconds and then back on, using your utility power outlet.

SPACECRAFT  Ok, if it doesn't work, understand you want to cycle power on that teleprinter.

CAPCOM  That's affirm, we would'd like to leave it off for approximately 30 seconds before putting it back on.

SPACECRAFT  Ok, and I think you said you want to do that at the utility outlet.

CAPCOM  That's affirm.

SPACECRAFT  We've determined that we have quite a bit of static on both intercom A and B and --

END OF TAPE
CAPCOM    Seconds before putting it back on.

SPACECRAFT  Okay, and I think you said you wanted to do that at
the utility outlet.

CAPCOM    That's affirm.

SPACECRAFT  We determined that we have quite a bit of static on
both intercom A and B and we've set up all of our units and so
far we're having a little bit of a hard time isolating it, it's
not as bad as it was the first time I talked to you.

CAPCOM    Okay, understand that Vance, its both ICOM A and B.

SPACECRAFT  Hey, Jerry, you'll have to repeat that.

CAPCOM    Roger, Vance, I was just confirming that it was
both on ICOM A and B that you have the static.

SPACECRAFT  That's correct, on both. It helped us a little bit
when we took three people off of one splitter, leaving only
two. But it didn't seem to solve the whole problem.

CAPCOM    Copy. Challenger, Houston we think the message is
onboard, we'd like status.

SPACECRAFT  Okay, we'll go take a look.

CAPCOM    Challenger, Houston, we're 15 seconds LOS, next is
TDRS at 11 plus 06.

SPACECRAFT  Hey, Jerry, we got a good copy on the teleprinter
message.

CAPCOM    Roger, thank you very much.

SPACECRAFT  Message 002 alpha water data.

SPACECRAFT  See you a little later.

CAPCOM    Roger.

PAO       This is Mission Control Houston, the orbiter
Challenger continues its path along the mid Pacific Ocean, on
orbit 8. On our last communication through the Guam tracking
station, we sent up a teleprinter message and the crew reported
that it came up clean. The last message they'd sent through the
Ascension station had been garbled but it looks like their
problem's corrected. One of the flight control officers here
also reports that a fuel cell purge sequence has begun, we're
standing by now for acquisition through TDRS in about 15
minutes. This is Mission Control Houston.

CAPCOM  Challenger, Houston, with you through TDRS, and we'd like to have a GNC SPEC 1 to allow us to change some variable parameters, please.

SPACECRAFT  Bob is getting that for you.

CAPCOM  Roger, thank you.

SPACECRAFT  Okay, Jerry, you got SPEC 1 on the (garble).

CAPCOM  Roger, we see that, thank you Bob.

SPACECRAFT  And Houston, would you like to have the results of the COAS cal?

CAPCOM  Roger, Vance, we'll take those.

SPACECRAFT  Okay, really, I had two updates. The first came out with a bias of 0.19 and updated that at 10 hours 21 minutes 30 seconds and obtained then two or three marks with biases of about 0.12. So updated that at 10 24 30 and then obtained some marks with about .09 bias, so accepted that.

CAPCOM  Roger, we copy that, Vance, thank you.

SPACECRAFT  (garble).

CAPCOM  And Challenger Houston, the SPEC 1 is yours again.

SPACECRAFT  Okay. The Penelopis is really a good star for that, real bright.

CAPCOM  Roger, copy that. I'll might sure FAO knows that.

SPACECRAFT  Oh is it clear enough weather at the Cape to see...

CAPCOM  Roger, I think your question Vance was whether or now we could see staging at the Cape and we had good pictures of that. I was home and saw it on TV, so I think they saw a good picture at the Cape as well.

SPACECRAFT  Okay, seemed like it might be pretty clear about the time we lifted off.

CAPCOM  Roger, and it looked like they could see well down range. We'd like to take both star trackers to track, Vance, and also for Ron, we're ready to go to those PUCAMU formats whenever he's available.
SPACECRAFT     Okay, Jerry. I'll get...
CAPCOM         Say again, Ron.
SPACECRAFT     I'll get right to it.
CAPCOM         Roger, that.
END OF TAPE
CAPCOM: We'd like to take both star trackers to track, Vance, and also for Ron, we're ready to go to those PUCKAMU formats whenever he's available.

SPACECRAFT: Okay. Okay, Jerry, I'll get (garble).

CAPCOM: Say again, Ron.

SPACECRAFT: I'll get right to it.

CAPCOM: Roger that.

CAPCOM: Challenger, Houston for one of the five noses that was pressed against the windows after the PAM deploy, we have some questions for you.

SPACECRAFT: Go ahead, Jerry.

CAPCOM: Roger, Bob. We'd like a little more general information of what you saw as the vehicle went out. Did you see any coning, did you get the chance to see the OMNI's deploy, and were you able to observe the RCS jets activate?

CAPCOM: Challenger, Houston, back with you after a COMM drop.

SPACECRAFT: Go ahead.

CAPCOM: Roger, did Bob copy all my question, and if so, we did not get any of his response.

SPACECRAFT: He gave a detailed response. I think, in essence, when we observed it go out, it looked solid. There was absolutely no coning. We did not observe anything that it -- in the way of jet firing. We could not see the OMNI in PAM and deploy, and that was, I suppose, mainly because we were looking at the wrong end of the vehicle.

CAPCOM: Roger. Copy and understand that, and understand you did not see any RCS firings.

SPACECRAFT: No Jerry, I didn't see anything. It just went out, looked steady as a rock, saw no nutation, saw no activity from it.

CAPCOM: Okay, copy all that. Thank you.

SPACECRAFT: Okay, Jerry, that PC and MU load is complete.

CAPCOM: Copy that, Ron. Thank you.

SPACECRAFT: Houston, Challenger.
CAPCOM     Go ahead.

SPACECRAFT  Jerry, I started an auto fuel cell purge, probably 40 min ago or so, and I never noted the O2 or H2 flows go up. Now it may be that they all happened quick enough that I just didn't notice them. I do see the heater temps up a bit, but I was wondering if maybe you all saw the purge actually happen.

CAPCOM     Okay, standby. I'll ask our John what he saw.

SPACECRAFT  Okay. Thanks, Jerry.

CAPCOM     Challenger, Houston for Hooter.

SPACECRAFT  Yes, Jerry.

CAPCOM     Yeah, Hoot. We saw you initiate the purge, and everything was looking good, too, as you went LOS. We're looking at playback data right now. We'll try to get you an answer in a little bit.

SPACECRAFT  Okay. I still have, even now, the GPC purge sequence talkback grey on the fuel cells, and I'll stand by to see what you find out.

CAPCOM     Okay, copy that, Hoot. We see that the heaters are still active to purge the lines after the purge.

SPACECRAFT  Okay.

CAPCOM     Challenger, Houston. Be advised, we're sending you up a new state vector.

SPACECRAFT  Okay. Copy.

PAO        This is Mission Control, Houston, at 11 hr, 35 min. The Orbiter, Challenger, is on its 9th orbit now passing over the southern Atlantic Ocean. We're in the middle of a shift handover here in the Mission Control room. CRT's are in flight configuration according to DPS, and the EECOM reports that we did get that fuel cell purged that was asked about a little earlier. Right now, we're still handing over and we're approaching LOS with TDRS in about 24 min. This is Mission Control, Houston.

SPACECRAFT  Houston, this is Challenger (garble) copy.

CAPCOM     Roger, Challenger. We copy you loud, somewhat garbled.

END OF TAPE
PAO ...TDRS in about 24 minutes. This is Mission Control Houston.

SPACECRAFT Houston, this is Challenger, on the speaker mike, how do you copy?

CAPCOM Roger, Challenger, we copy you loud, somewhat garbled.

SPACECRAFT Okay, thank you.

CAPCOM Challenger, Houston with a couple of notes for you.

SPACECRAFT (garble)

CAPCOM Roger, Challenger, we got a lot of squeal and background noise there. First thing, fuel cell purge. We now see the sequence is complete, we still have not seen in the playback a actual change in the flows going through the fuel cells but we have no reason to believe that they did not occur. Secondly, your onboard state vector is good through rev 14 and also if one of you could give us a further description of the ICOM A, B noise that you've been receiving. First of all, we'd like to know when you first noticed it, also we'd like a better description as to what the noise is like, and thirdly, is it tied to any certain position in the orbit or is it more or less continuous, over?

SPACECRAFT Okay, Jerry, to try and tackle the ICOM noise a little bit more, it seems to be relatively continuous no matter where we are and it's, as you mentioned, on both ICOM A and B and we've tried individually each one of us shutting down our wireless comm at each station, and that doesn't improve it any at all. I mentioned it's on both A and B and we've tried changing a number of the batteries to no avail.

CAPCOM Okay, could you tell us approximately when you first noticed it, has it been the entire flight, and also can you describe the noise that you're getting?

SPACECRAFT Okay, as I recall, Jerry, we picked it up first at probably about 5 hours MET or so, four hours or five hours, somewhere in that time frame and it's pretty much a continuous running static on both of the ICOM's.

CAPCOM Roger, copy that, Hoot, and was that both on hardline as well as the wireless?
SPACECRAFT    Jerry, Vance tried the hardline and he still had the noise on the hardline.

CAPCOM     Roger, copy all of that. We've got 8 minutes -- 18 minutes til LOS. Challenger, Houston, we're 15 minutes to LOS, TDRS will start getting somewhat scratchy. I've got two items on the presleep activity, that we don't see accomplished yet.

SPACECRAFT    Okay, go ahead.

CAPCOM     Roger. The two that we don't see accomplished yet are the Ku-band antenna cable repositioning, that's item 8 on page 3-2 of the orbit pocket, and on 3-3, the LiOH changeout, item 10.

SPACECRAFT    Roger, Houston, this is Challenger. We've been holding off on the Ku-band cable repositioning until we were sure that you weren't going to try and pick us up through TDRS and the LiOH changeout is listed as the last item for a 5-man crew, over.

CAPCOM     Roger, that Bruce, we concur on both. We're through with the antenna, you can proceed with it and understand the LiOH and concur with it. We probably will not be giving you any more calls unless necessary from here on.

SPACECRAFT    Okay, we copy and we'll get on with the Ku-band antenna cable repositioning.

CAPCOM     Roger that and have a good night sleep, we'll see you in the morning.

SPACECRAFT    (garble). Houston, Challenger.

CAPCOM     Roger, Challenger, go ahead Vance.

SPACECRAFT    I'm going through the presleep, the checklist, page 3-3 indicates we should turn the food warmer off. Of course, we don't have one, we have a galley, would you think it'll be alright if we could just leave the galley power on?

CAPCOM     Roger, we don't have any problem with that, Vance.

SPACECRAFT    Okay.

END OF TAPE
This is Mission Control, Houston at Mission Elapsed Time, 12 hr, 16 min. Orbiter Challenger is passing over Asia on orbit 9. We're expecting to begin our change-of-shift press conference with offgoing Flight Director, Harold Draughon, on time at 7:30 in building 2, room 135 at JSC. This is Mission Control, Houston.

This is Mission Control, Houston. Challenger on the descending node of orbit 9 over the mid-Pacific. All quiet here in the Mission Control Room at Mission Elapsed Time, 12 hr, 31 min. We're expecting to begin the change-of-shift briefing momentarily in building 2, room 135. This is Mission Control, Houston.

Mission Control, Houston. We're still standing by for the change-of-shift briefing in building 2, room 135. We should get underway in the next few minutes. This is Mission Control, Houston at 12 hr, 44 min.

This is Mission Control, Houston. All quiet in the Mission Control Center as the Orbiter, Challenger, approaches the ascending node of orbit number 10. The crew is in their sleep period now. We show a temperature of 83 deg in the cabin. The cabin pressure, 14.9 psi and the humidity, 29 percent. The planning shift here in the Mission Control Room is watching a playback of this morning's launch. They hadn't had a chance to see it, and we're just about to launch Challenger here in the Mission Control Center at Mission Elapsed Time, 13 hr, 12 min. This is Mission Control, Houston.

END OF TAPE
PAO

This is Mission Control Houston, all quiet here in the Mission Control Center as the orbiter Challenger now passes over the southern Pacific Ocean on orbit 10. It is now in a 171 by 165 nautical mile orbit, it's current altitude is 167.1 nautical miles. Right now, the Flight Control Team is viewing playbacks of the day's video and we're still in the process of using ground stations and other facilities around the planet to search for the Westar satellite. There were some C-band passes once at Quajalon and then later at Ascension twice, looking for Westar on a vector which would have assumed -- that vector would have assumed that there was no burn and in looking at that vector, they did not see the satellite so there is some early indication that at least some sort of burn took place, but right now we're not sure exactly what type or if indeed that did happen. That's just an early indication and we're still awaiting some word from NORAD and from other ground sites to see if we can lock down just what did happen to Westar. At Mission Elapsed Time 14 hours 13 minutes this is Mission Control Houston.

PAO

This is Mission Control Houston. We are processing high rate TDRS data as the orbiter Challenger moves along orbit 10 towards the coast of South America over the Eastern Pacific Ocean. Here in the Mission Control Center, there is an update on the Westar situation. The payloads officer reports that NORAD has been looking for the satellite first based on two premises, that there had been no burn and secondly, on the premise that there had been a full burn. And where that satellite would had have been had either of those situations taken place, there was no satellite to be found so NORAD is now looking at cases for partial burns, right now on the premise that it may have been a 10-second burn and then they'll move that on up and check all the possibilities through the full duration burn which normally would have been 80 seconds. So at this point we have no real new information to report on the whereabouts of Westar and what the situation is with the satellite itself. At Mission Elapsed Time, 14 hours, 35 minutes, this is Mission Control, Houston.

END OF TAPE
PAO This is Mission Control, Houston. Orbiter, Challenger, approaches the west coast of South America on the end of orbit 11. All continues to be quiet here in Mission Control and aboard the spacecraft. This crew's in the midst of their sleep shift, their sleep period. The Orbiter now is at an altitude of 168.6 nautical miles and the longitude and latitude are 15.6 south by 86.8 west. At 16 hr, 9 min, this is Mission Control, Houston.

PAO This is Mission Control, Houston, at Mission Elapsed Time, 16 hr, 33 min. The Orbiter, Challenger, is now on rev 12 across the coast of north Africa and, basically, pretty quiet over here in the Mission Control Center right now. One of the items of business that's been discussed over here is a fix to one of the small anomalies that was discovered today, the peeled back thermal blanket on a Get Away Special canister that holds the Cinema 360 system, Cinema 360 payload. A fix to that which may be suggested is for crewmembers on the EVA later this week to try to reattach that thermal blanket. It appears, according to the payload's officer, that it's nothing more than just velcro that came undone during the launch vibrations. And the possible interference that that peeled back blanket might cause is some difficulties opening the GAS can lid when the time comes, so they may well ask the crewmembers to go in and reattach that. At Mission Elapsed Time, 16 hr, 34 min, this is Mission Control, Houston.

PAO This is Mission Control, Houston. Orbiter, Challenger, now passing over the west coast of north Africa at Mission Elapsed Time, 18 hr, 7 min. Mission managers have chosen not to go for deployment of PALAPA tomorrow pending some sort of further understanding of what seems to have gone wrong with the Westar deployment today. Should that be the case, and we do not go for the deploy --

END OF TAPE
PAO ...and if mission managers have chosen not to go for deployment of PALAPA tomorrow pending some sort of further understanding of what seems to have gone wrong with the Weststar deployment today, should that be the case and we do not go for the deployment, we would normally go for a flight day three deployment on orbit 32 descending node and on orbit 33 ascending node PKM burn. We are, however, still studying the possibilities of just when and where we would attempt to deploy PALAPA and still conducting radar scans to see if we can't find what happened to Westar. At Mission Elapsed Time, 18 hours, 8 minutes, this is Mission Control Houston.

PAO This is Mission Control Houston, the planning team here in the Mission Control Center is now working with the crew activity plan, rescheduling the events of tomorrow and various elements leading up to the PALAPA deploy early in the day and other elements of the crew's flight day two activities to take into account the fact that we've decided not to deploy PALAPA at the first opportunity. We're still also trying to track the Westar satellite. We do not know where it is at this time. The Orbiter itself is in good shape from a systems standpoint, it's been a quiet night, Challenger's now over the Indian Ocean on rev 13. We would also like to see if we can get some expression of interest or no in a change-of-shift briefing that's now scheduled for 2:30 a.m. approximately CST. It's our intention to cancel that briefing unless we get some expression of interest in discussion of Orbiter systems. At this point there's not a whole lot more that off-going flight director Larry Bourgeois could add to any questions the news media might have on the PALAPA or the Westar. That's all still in the planning stage or in the investigation stage. If you do have comments on the change-of-shift briefing, call the JSC newsroom or the KSC newsroom. At Mission Elapsed Time, 18 hours 35 minutes this is Mission Control Houston.

PAO This is Mission Control Houston, at Mission Elapsed Time 18 hours 52 minutes. We have received no expression of interest from the news media in a 2:30 a.m. change-of-shift press conference, so we're going to go ahead and cancel that. Repeating, we have canceled the 2:30 a.m. change-of-shift press conference with planning team Flight Director Larry Bourgeois.

PAO This is Mission Control Houston, Mission Elapsed Time 19 hours. To repeat, we have canceled the change-of-shift press conference that was scheduled for 2:30 a.m. Central Standard Time from the Johnson Space Center with the off-going Flight Director Larry Bourgeois. That change-of-shift press conference has been canceled. This is Mission Control.

PAO This is Mission Control Houston, at 19 hours and 19 minutes Mission Elapsed Time. The Challenger is out over the Pacific Ocean and is about to begin orbit number 14 and then
will cross central America just a few minutes later. The handover here in Mission Control has been essentially completed. The off-going flight director is Larry Bourgeois. The on-going flight director Randy Stone, taking over for the first shift of the day. The crew has about 40 minutes remaining in their scheduled sleep period and then will be getting up to start their day. The PALAPA deploy scheduled for later in the day has been...

END OF TAPE
PAO ... taking over for the first shift of the day. The crew has about 40 minutes remaining in their scheduled sleep period and then will be getting up to start their day. The PALAPA deploy, scheduled for later in the day has been rescheduled. That delay is to allow the Payload Assist Module engineers time to look closely at their systems, to determine if there is any reason they should not be confident in the deployment of the LAM and the PALAPA satellite. That delay would be to the backup deploy opportunity which is on rev 32. The reason for that delay, of course, being the difficulties in the apparent -- that apparently occurred about the time of the firing of that Solid Rocket Motor on the Payload Assist Module for the Westar and its deployment yesterday on flight day 1. So the delay will allow the engineers who work on that Payload Assist Module, built by McDonnell Douglas, to review and see if they have any reasons for being less than fully confident, when a similar piece of hardware used on the PALAPA satellite would also be called in to play. Final adjustments to the teleprinter messages going up to the crew, some small replanning, moving up of some of the experiments that had been scheduled for tomorrow, moved up to today so that they would not be missed as we shift the PALAPA deploy 1 day. All Orbiter systems appear to be functioning very well. A review by the flight controllers here during the handover shows no problems of any significance onboard the spacecraft, just a few very minor things that they are keeping watch on that are typical of the small problems that will always crop up during a flight. Just anomalies in systems, nothing that will have any impact on the flight, or its duration, or the functioning of any major systems. We're at 19 hours, 22 minutes mission elapsed time, this is Mission Control, Houston.

PAO This is Mission Control, Houston at 20 hours, 4 minutes mission elapsed time. The Challenger is on orbit #14 and has passed out of range of the tracking data relay satellite so we are not currently getting data from the spacecraft, but the indication just as we went LOS there was that one of the CRTs was turned on, powered up, an indication that the crew is awake and we are indeed out of their scheduled sleep period, though we have not yet made voice contact with the crew this morning. Our next possible pass is the Yarragadee UHF site in about 10 1/2 minutes. All systems onboard the Challenger continue to look very good and the crew is going to be starting off on a day somewhat different than that originally planned before the flight. This was to have been the day for the deployment of the PALAPA, the Indonesian Communications Satellite, that having been delayed to its backup opportunity on orbit #32 because of the difficulties experienced by the Westar satellite during its attempt to move from a lower orbit to its geosynchronous transfer orbit. That delay was made to give engineers who work on the Payload Assist Module built by McDonnell Douglas, that is the Solid Rocket Motor which boosts the satellite up on to its transfer orbit, to give them time to decide whether they have
confidence that a similar system used by the PALAPA would not also give them trouble. Challenger passing out over the Indian Ocean at the present time. We could be hearing ...

END OF TAPE
PAO    ...decide whether they have confidence that a similar system used by the PALAPA would not also give them trouble. Challenger passing out over the Indian Ocean at the present time. We could be hearing from the crew over the Yarragadee pass in about 9 minutes, at Mission Elapsed Time, 20 hours 6 minutes, this is Mission Control Houston.

(wake-up music)

PAO    And this is Mission Control, 20 hours 8 minutes Mission Elapsed Time. That short burst of music there a few moments ago was the communications technicians getting the wake up music ready for the -- to be played over the Yarragadee pass, coming up in about 6 minutes. This is Mission Control Houston.

(wake-up music)

CAPCOM   Good morning, Challenger, how are you doing? Challenger, Houston, good morning.

SPACERACFT   Morning, John ... we recognize that, we're not real sure.

CAPCOM    Roger, we understand. Vance, everyone would like to congratulate you on a fantastic launch and first day in orbit yesterday, you guys really were on the timeline. For your information as you're all waking up, we're deploying, delaying the PALAPA deploy, one day, PALAPA has chosen to do this since the status of the Westar PKM burn is still unknown. We're sending up an additional message number 8 at Orroral Valley, which will highlight your activities after lunch today.

SPACERACFT   Okay, John, we understand, and we're just starting to get through this teleprinter message now.

CAPCOM    Roger.

PAO    This is Mission Control Houston. We have the first contact this morning with the Challenger crew over the Yarragadee station in western Australia. Wake-up music had been planned to be a selection from the Contraband, that group of NASA employees and would have featured Ron McNair, astronaut Ron McNair on the tenor sax, but that somehow got garbled in the translation going up. The crew has been informed that they will not be doing the scheduled deployment of the PALAPA satellite today, that that will be reset for its backup opportunity on orbit number 32. We're at 20 hours 19 minutes, mission elapsed time, this is Mission Control Houston.

SPACERACFT   Houston, this is Challenger, over.

CAPCOM    Roger, go Bruce.
SPACECRAFT Yes, John, in getting organized for presleep last night, you all called us and asked about the Ku-band antenna cable positioning and LiOH canister replacement, and I mentioned to you that the checklist called out the LiOH canister replacement for a 5-man crew as being the last thing that you do in presleep before you go to bed. And then we got just about everything else finished up and some of us were looking out the windows and things of that sort and I went to bed early and to make a long story short, we didn't get the LiOH can changed out last night. We have just changed one, the question we -- and the PP of CO2 is up to 2.2, the question we have for you right now is should we change two this morning and get back on the one at a time starting tonight, or should we just change one tonight and get on it right there, over?

END OF TAPE
SPACECRAFT  -- and at 2.2, the question that we have for you right now is, should we change two this morning and get back on the one at a time starting tonight, or should we just change one tonight and get on it right there? Over.

CAPCOM  Roger, Bruce. EECOM says that one is sufficient now, and you can just get back on the normal schedule, and we're going LOS. We'll see you at Orroral.

SPACECRAFT  Okay. Thank you very much.

CAPCOM  Challenger, Houston back with you at Orroral for 5 min. We'll be sending you a state vector.

CAPCOM  Challenger, Houston. We're going LOS Orroral in 30 sec. See you TDRS, 20 plus 46.

SPACECRAFT  Okay, John. We'll see you there.

PAO  This is Mission Control, Houston at 20 hr, 30 min Mission Elapsed Time. We've had a loss of signal with the Challenger through the Orroral station. Spacecraft is passing out over the Pacific now. We've got about 17 min before we reacquire, and that'll be through the Tracking Data Relay Satellite, and that will be just before the start of orbit number 15. Crew of the Challenger now beginning flight day 2, a little different than originally planned preflight. We will not be doing the deploy of the PALAPA, the Indonesian Communication Satellite, today to give the engineers who work with that secondary booster system a chance to look at that, the Westar satellite, which uses the same Payload Assist Module, it's called, which sends the satellites up to their transfer orbit on the way to geosynchronous. Those engineers will be looking at the difficulties experienced by the Westar if they can put together enough data on that, and try and decide whether it is a difficulty that could also be shared by the PALAPA. So we would be deploying the PALAPA on the orbit 32 opportunity which occurs later on in the flight, and we'll be moving up some other activities to today, primarily, some experiment runs, and the flight controllers here have a shopping list of items they might like to put into the time slot which would have been occupied by the PALAPA deploy. So we'll be picking up again in about 15 min from now through the Tracking Data Relay Satellite. This is Mission Control.

CAPCOM  Challenger, Houston's with you again through TDRS.

SPACECRAFT  Okay, Houston. Reading you loud and clear. Hey, John, after discussing it onboard, we went ahead and changed out the second LiOH can anyway so that we'd get back onto the nominal configuration as shown in our onboard cue card. We were a little concerned that if we didn't do that, we'd probably get confused
later on during the mission in trying to keep the right sequencing of cans. Over.

CAPCOM Roger. That's fine, Bruce.

CAPCOM Challenger, Houston. I hate to bother you, but if somebody has a minute, I have a change to message number 4.


CAPCOM Roger. I have a change to message number 4 on the teleprinter, 4 Bravo, if you want to get ahold of that.


CAPCOM Roger. Go down to line 31 through 34 there. Delete that activity of changing the PICKAMU formats.

SPACECRAFT Okay, We copy that, John. We'll delete that PCMMU change.

CAPCOM Roger, and we want to do that because we're not doing a deploy.

SPACECRAFT Okay. We copy.

SPACECRAFT Houston, Challenger. Over.

CAPCOM Roger. Go ahead, Bruce.

SPACECRAFT Roger, John. Is this a convenient time with you all to do the Ku antenna cable positioning? Over.

CAPCOM Roger that, Bruce. We're go when you are.

SPACECRAFT Okay. Thank you.

SPACECRAFT And John, are you seeing our alignments?

CAPCOM Roger. We're looking at the data with low data rate, Vance.

SPACECRAFT Okay. Well, I can give you the numbers if you'd like.

CAPCOM Roger. We are ready to copy.

END OF TAPE
SPACECRAFT    And John are you seeing our alignment?
CAPCOM       Roger, we're looking at the data with the low data
rate, Vance.
SPACECRAFT  Okay, well I can give you the numbers if you'd
like.
CAPCOM       Roger, we are ready to copy.
SPACECRAFT  Okay, stars 17 and 21 angular air .01, starting out
horizontally with delta X, minus .14 minus .23 plus .06.  Delta
Y, plus .25 plus 0 minus .23.  Delta Z, plus .06 minus .09 minus
.32.  Execution time 0/21:03:20.
CAPCOM       Roger, we copy all of that, thanks a lot.
SPACECRAFT  This completes ... roger.

PAO       This is Mission Control Houston, at 21 hours 17
minutes Mission Elapsed Time.  Challenger is passing out over the
Atlantic Ocean on orbit number 15.  The crew is beginning to go
through their preparations for the start of flight day 2, about
half an hour ago we heard from Mission Specialist Bruce
McCandless, talking about changing out the lithium hydroxide
canisters which purify the air and they have to be changed out
periodically.  The spacecraft was maneuvered to the IMU ailine
attitude and the spaceship's star trackers observed a star pair
used for navigation purposes so that the spacecraft's onboard
navigation system can calculate where it is.  It's a routine
navigation activity done every morning, the start of the day
right along with making the morning coffee.  And the crew is
reading their teleprinter messages, those that have been sent up
to date, the revisions to the timeline which is different from
the preflight timeline in that we have delayed the planned
deployment of the Indonesian satellite, the PALAPA, until the
orbit number 32 which is the backup opportunity for the
deployment of that satellite.  That will give engineers who work
on the Payload Assist Modules that both the PALAPA and the Westar
have attached to them to boost them up to geosynchronous transfer
orbit, give them time to analyze what may have gone wrong with
the system onboard the Westar.  That satellite is essentially
still unaccounted for and engineers trying to assess what
occurred there and whether they should be concerned about the
deployment of the PALAPA for any reason.  Orbiter systems
generally performing very well, this being one of the cleanest
missions to date in a recently fairly long series of missions
with very few systems problems.  Things seem to be going very
well and not much to talk about when the handover between flight
control teams took place earlier this morning.  We've been having
just a little bit of communication with the crew this morning,
not too much, they haven't really gotten into any of the
activities yet other than the preparations for the day. We're at 21 hours and 20 minutes, Mission Elapsed Time, this is Mission Control Houston.

CAPCOM Challenger, Houston, I have a note from RMU reference your APU hydraulic alarm.

SPACECRAFT Okay, I was just getting ready to look after that John, what do you see?

CAPCOM Roger, first of all, no action on your part, it's not a problem. We've looked at the data and we've chased it down to a TMBU that we sent you correcting your gaseous nitrogen mass count for the water spray boiler, we need to change the limit and no action on your part.

SPACECRAFT Okay, John, we copy.

CAPCOM Challenger, Houston, we saw your interconnect, your configuration looks good. Good show.

SPACECRAFT Okay, John, thanks.

END OF TAPE
This is Mission Control Houston, at 21 hours 41 minutes mission elapsed time. We've had loss of signal with the Challenger through the Tracking Data Relay Satellite. Challenger is passing out over the Indian Ocean at the present time and we'll be picking up again in about 9 and a half minutes over Yarragadee and Australia. The crew is currently in their -- still in their post sleep activity, according to the timeline, and they'll be getting into their first morning activities other than the IMU alignments, which have already been done, fairly shortly with the setup of the Acoustic Containerless experiment. And the Isoelectric Focusing activation. 21 hours 42 minutes, this is Mission Control Houston. Mission Control Houston, 21 hours 51 minutes, standing by for acquisition through Yarragadee.

Challenger, Houston's with you at Yarragadee for 8 minutes.

Hello, John, you're loud and clear through Yarragadee.

Roger, you're loud and clear also. Challenger, Houston. We're going LOS Orroral in 20 seconds, see you at TDRS 22 plus 24.

Okay, John, we copy that and I might add the ECLSS check on the cryo tank heater test went well, that was all good.

Challenger, Houston's with you through TDRS again.

Hello John, welcome back.
CAPCOM  Roger, you're loud and clear. Challenger Houston, GNC is going to compensate your IMU's and if somebody has a moment to tell us how the ICOM is working today.

SPACERFRAFT  Okay, we copy the IMU's. We're not having much luck with it and we've chased it around in the way of both ICOM A and ICOM B and right now we're just operating without the ICOM entirely. We've all tried changing batteries and we've all tried taking out particular switches to receive only on the ICOM and we can't figure out where all the noise is coming from. So we're at the moment just operating without it.

CAPCOM  Roger, we copy.

SPACERFRAFT  And John, one additional comment along those lines, an auxiliary but very loud source of noise when it operates is the pump in the galley that circulates the water around inside the galley. When it cuts on, it really blasts you out, over.

CAPCOM  Roger.

SPACERFRAFT  (garble) wireless units.

CAPCOM  Roger, say again the last comment.

SPACERFRAFT  Sounds like...that's using wireless units, it sounds like that galley water pump is generating EMI.

CAPCOM  Roger, copy Bruce, thanks a lot for the comments.

END OF TAPE
ST S-41-B AIR/GROUND TRANSCRIPT  t55j  035:11:27  2/4/84 PAGE 1

SPACECRAFT  (Garble) units.

CAPCOM  Roger. Say again the last comment was --

SPACECRAFT  Sounds like -- that's using wireless units. It
sounds like that galley water pump is generating EMI.
that galley water pump is generating EMI.

CAPCOM  Roger. Copy, Bruce. Thanks a lot for the
comments.

SPACECRAFT  John, also up here, I'm watching water tank alpha
quantity is apparently going down a little bit, and we believe
the TMBU's had perhaps TMBUe at 95 percent instead of 25.

CAPCOM  Roger. Understand. EECCOM will look at it.

CAPCOM  Challenger, Houston. Just for your information,
EECCOM's looked at that and he's advised that the tank usually
does that after a B-dump, some of the water goes back into tank
Bravo from A. We've seen that signature before on previous
flights. We'll go ahead and bump the TMBU down a bit to prevent
another nuisance alarm.

SPACECRAFT  Okay. Great. We copy that. Thanks, John.

CAPCOM  Roger that, Hoot.

SPACECRAFT  John, we got the ACES activated at 22:30 and green
lights are on both canisters.

CAPCOM  Right. Understand, Ron, if you could repeat the
time. There was some noise in the background.


CAPCOM  Roger. We copy, Ron. Thanks a lot.

SPACECRAFT  Houston, Challenger.

CAPCOM  Roger. Go ahead.

SPACECRAFT  John, how does this air to ground sound to you? I'm
getting a lot of noise on this end when I my transmit.

CAPCOM  Roger. Understand, Ron. You're getting a lot of
noise on your end when you transmit and we're hearing it as well.

SPACECRAFT  Okay. I'll try to talk slowly (garble) noise. I
got the IUS activated at MET 0 days, 22 hr, 38 min, and we got a
gray talkback on the IEF. The ACES is currently running. We
still have the green lights. The present noise level is barely perceptible. You really have to put your ear up on the canister to hear it at this stage of the furnace process. Over.

CAPCOM Roger. We copy them, Ron, and you are coming through, and we hear the loud noise as a carrier.

PAO This is Mission Control, 22 hr, 41 min Mission Elapsed Time. Mission Specialist Ron McNair reporting a moment ago that the Acoustic Containerless Experiment System is up and running as is the Isoelectric Focusing experiment. The ACES, the Acoustic Electric, rather, Acoustic Containerless Experiment, is a materials processing system. It's an automated experiment in the Orbiter middeck which does some materials processing on a preprogrammed series of events and then shuts itself off. The Isoelectric Focusing experiment is designed to evaluate the effect of electro osmosis on isolectric focusing in a zero-gravity environment, and involves applying a dc voltage on an electrolyte system and observing the migration within that electrolyte system. The Challenger is passing over the Atlantic Ocean at the present time, just about at the high point in its ground track at 28-1/2 deg, and we're currently in communication with the spacecraft through the Tracking Data Relay Satellite. We have about 35 more min of coverage remaining under the TDRS before we go LOS. At 22 hr, 43 min, this is Mission Control, Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger. Go ahead.

SPACECRAFT John, Hoot and I are cutting out or else delaying our exercise periods for the sake of ACES.

CAPCOM Roger. Understand.

END OF TAPE
STC-41-B AIR/GROUND TRANSCRIPT t56j 035:11:44 2/4/84 PAGE 1

SPACECRAFT ...cutting out or else delaying our exercise
periods for the sake of ACES.

CAPCOM Roger, understand.

SPACECRAFT Houston, this is Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Yes, John, just wanted to report to you that the
HRM III was activated at 22:55.

CAPCOM Roger, understand, thanks a lot, Bob. And Bob,
when you just talked to us, were you down on the middeck?

SPACECRAFT That's affirm, I'm up on the flight deck now.

CAPCOM Roger, understand, when you transmitted to us a
minute ago you were on the middeck, correct?

SPACECRAFT That's correct.

CAPCOM Okay, and are you getting any noise, we are not
while you are talking to us.

SPACECRAFT (garble) my ICOM is turned off, but I'm not getting
any noise on that valve.

CAPCOM Okay, you're coming through very loud and clear to
us. For some reason when Ron was talking to us about 10 minutes
ago, there was a great deal of noise along with his voice.

SPACECRAFT How do you read me now, I still have the noise
present, how do you read?

CAPCOM Roger, and Ron, confirm the noise is present when
you're talking to us as well. And understand you are down on the
middeck?

SPACECRAFT That's affirm.

SPACECRAFT And John, I've got the PALAPA ace thermal check
coming to you.

CAPCOM Roger, that, we're looking for it.

SPACECRAFT Okay John, this is a radio check with the pump in
the galley running. It just quit.

CAPCOM Roger, you're loud and clear, Bruce.
SPACECRAFT Did you hear any noise in the background at the beginning of that last transmission?

CAPCOM Negative, not at all and are you hearing any yourself when you transmit to us?

SPACECRAFT That's affirmative.

CAPCOM Understand, you're hearing it, thank you.

SPACECRAFT Roger, from the -- with the pump in the galley at the time of that transmission.

CAPCOM Roger. And Challenger, Houston, while we're talking about the comm, INCO has a question he'd like to ask and that is, have you ever tried putting all of the audio panels in receive at the same time, on ICOM A and B?

SPACECRAFT John, I can't read you over the noise right now, can you wait a second?

CAPCOM Okay, tell me when you're ready Bruce.

SPACECRAFT John, I think we have tried all of them in receive at the same time, but I'm not sure, we may go try it again.

CAPCOM Okay.

SPACECRAFT Hey, John, did the (garble) data look okay, on PALAPA.

CAPCOM Roger, that, it looks good to us.

SPACECRAFT (garble)

CAPCOM Challenger, Houston, we're going to be going LOS TDRS in about 3 minutes. If somebody has a minute, INCO would be interested in knowing the location of each crewman's wall unit, this will help us try to troubleshoot the intercom problem.

SPACECRAFT Houston, Challenger, in the way of the ICOM, we think that maybe we have cleared it up quite a bit, it looks like the bravo unit may have been putting a bunch of noise in. We don't know exactly how it could have done it, because even in just receive we were getting noise out of the system, but with the bravo unit down right now, the ICOM seems to be half decent.

CAPCOM Understand, Hooter, that's good news. You're sure loud and clear to us.
SPACECRAFT Okay, great.

SPACECRAFT And John, just checking to see if you still have a problem with noise during my transmissions?

CAPCOM Negative, Bob, you're loud and clear.

SPACECRAFT Okay, understand, loud and clear, that sounds good.

CAPCOM Roger, that, Ron.

SPACECRAFT Okay, and ...

END OF TAPE
And, John, just checking to see if you still have a problem with noise during my transmissions.

Negative, Bob. You're loud and clear.

Okay. Understand loud and clear. That sounds good.

Roger that, Ron.

Okay, and Ron's comm was - Ron and I were getting together the pilot's wall connection.

Okay. Understand. Well, both of you are loud and clear to us right now.

That's affirmative. I moved the E-unit up to the back of the CDR's seat to get it out of the way, got a little farther away from the galley. We'll have to let you know how that works out. Right now, Hoot and I are both running on E-units with the one wall unit on the back of the CDR's seat. Over.

Roger that, and you're loud and clear, as well, Bruce. We'll see you at Yarragadee at 23 plus 27.

Okay, John, see you there.

This is Mission Control, Houston at 23 hr, 17 min. Mission Elapsed Time. Challenger passing beyond the range of the Tracking Data Relay Satellite over the Indian Ocean. That discussion there over the last few minutes centering on noise problem that they'd had with the intercom onboard the Challenger, and they seem to have sorted out pretty well. One of the crewmembers reported earlier that they had completed the temperature check of the PALAPA satellite's Airborne Support Equipment and Payload Assist Module, and that looked good. Vance Brand, Commander, reported that he and Pilot, Hoot Gibson, would probably be cutting out or delaying their exercise period that was scheduled this morning to accommodate the ACES, the Acoustic Containerless Experiment System, which was running at the same time. Vibration of the jarring in the middeck area during an exercise period could conceivably interfere with that experiment running. We'll be out of communication with the spacecraft for 8-1/2 min until we acquire over Yarragadee in western Australia. This is Mission Control, Houston.

Challenger, Houston's with you at Yarragadee for 8 min.

Roger, Houston. Challenger. Loud and clear.
CAPCOM    Roger. And you are loud and clear.

CAPCOM    Challenger, Houston. We're going LOS in 30 sec. See you at Hawaii at 23 plus 56.

SPACECRAFT    Okay. See you there, Houston.

PAO    This is Mission Control, Houston at 23 hr, 36 min Mission Elapsed Time. We've had loss of signal with the Challenger through the Yarragadee station, and we're about 20 min away, 19-1/2 min away until we hear from the crew again through the station at Hawaii. That would be about the start of orbit number 17. This is Mission Control, Houston.

PAO    Mission Control, Houston, at 23 hr, 54 min Mission Elapsed Time. We're standing by for acquisition through Hawaii.

CAPCOM    Challenger, Houston's with you at Hawaii for 3-1/2 min.

SPACECRAFT    Okay, Guy, we copy you loud and clear. Got a question on our ACES for you.

CAPCOM    Roger. Go ahead, Ron.

SPACECRAFT    ACES was activated at 22:30, as I mentioned to you earlier. We did several status checks. At 23:48, we noticed that 3 auto lights on the (garble) were on, and L-2, all the electronic scans was blank, and we had all the status lights lit except the L-2 on the electronic scan. At this point, we expect all the lights to be on. We are thinking it's just a burned out light, but we would like to get your assessment of it. We could not determine if the acoustic's still going. The noise of the level is so low, we really can't differentiate it from the cabin noise, but we have a light (garble) is out, but like to get your thoughts on that.

CAPCOM    Roger. Understand, Ron. Payload's we'll look at that and will advise.

SPACECRAFT    Okay.

END OF TAPE
... from the cabin noise but we have a light (garble) out but would like to get your thoughts on that.

CAPCOM Roger, understand, Ron. Payloads will look at that and we'll advise.

SPACECRAFT Okay.

CAPCOM And Challenger, be advised that weather message #9 has been sent up to you to cover revs 18 to 22.

SPACECRAFT Okay, John, thank you.

CAPCOM And Challenger, also just for your information, when we go LOS here at Hawaii, we will start our TDRS encryption test and we will be running that the remainder of the day.

SPACECRAFT I understand that means you want us to go to TR at LOS Hawaii and for every TDRS pass the rest of the day? Over.

CAPCOM Roger, and we will be making the calls, Bruce.

SPACECRAFT Okay, thank you.

SPACECRAFT Okay John, on that ACES look, it seems that the acoustic frequency has shifted such that I can now hear it and it further confirms that we probably have a burnt out light. I did hear the acoustics of the experiment is still operating.

CAPCOM Roger, copy, Ron.

SPACECRAFT You know, John, a question for the comm guys. We notice up here while you're in contact, we're not getting any signal strength display on the S-band PM meter on alpha 1 uniform ALU or up on F9 either, over.

CAPCOM Roger, we copy, Bruce. Challenger, Houston, we are going LOS Hawaii, encryption TR, please. We'll see you on TDRS.

SPACECRAFT Okay.

SPACECRAFT Wilco, out.

PAO This is mission control, Houston at 1 day, 1 minute mission elapsed time. Challenger passing in a communications gap between the Hawaii tracking station and the range of the Tracking Data Relay Satellite. During the last bit of conversation, Capcom, John Blaha asking the crew to flip a switch onboard which configures their communication system to be in the encryption mode. That is similar to a test that was done on STS-8 and verifies the ground procedures for the encrypted communication that will be used during the DOD missions and eventually the NASA
flights as well. Mission Specialist Ron McNair had relayed the message that they were running the acoustic containerless experiment system and that one of the run lights was not on. Payloads people now indicate that they believe that the light is just burned out there and that the system is running. We should be picking up on Tracking Data Relay Satellite momentarily, this is Mission Control Houston.

CAPCOM Challenger, Houston's with you through TDRS, how do you read?

SPACECRAFT Loud and clear, John.

CAPCOM Roger, you're loud and clear.

CAPCOM Challenger, Houston. Ron, I have an explanation from Payloads on your question on the L2 light.

SPACECRAFT Okay, go ahead John.

CAPCOM Roger. Ron, Payloads say that they agree light L2 is burned out. For your information though, the experiment is operating as you called. No further action required. The acoustics will run for the remainder of the experiment.

SPACECRAFT Okay, John. Thanks a lot. Glad to hear that.

CAPCOM Challenger, Houston. We're going to be handing over to Mila now. I need you to take encryption to bypass. We're going to be doing this to send up a teleprinter message number 10.

SPACECRAFT Houston, Challenger. Look up.

CAPCOM Roger, Challenger. Houston's with you loud and clear. We think UHF through Mila. If you could take your encryption and put it to bypass please.

SPACECRAFT Okay, that's the encryption to bypass and we're coming right over you. We can see Galveston bridge.

CAPCOM Roger, understand and you look good up there. The reason we're switching over here with the encryption is we need to send up a teleprinter message number 10.

END OF TAPE
SPACECRAFT    Okay, that's encryption to bypass and we're coming right over here, as you can see Galveston bridge.

CAPCOM      Roger, understand and you look good up there. The reason we're switching over here with the encryption is we need to send up a teleprinter message #10.

SPACECRAFT  Okay, encryption's in bypass.

CAPCOM      Roger that, and this teleprinter message will provide a TV setup which we're proposing that we get in today as a result of our not doing the Palapa deploy.

SPACECRAFT  Okay. Houston, Challenger

CAPCOM      Roger, go ahead.

SPACECRAFT  Just a explanation on the fact that the cabin TV was not on yesterday, we had an overtemp, we turned it off and we could have probably turned it back on for the deploy itself or shortly, perhaps during that Hawaii pass, but we didn't get it back on again, we were letting the camera cool off.

CAPCOM      Roger, no problem at all with that, Vance, that worked out real well.

CAPCOM      Challenger, Bruce, INCO has an explanation for you as to why you're not seeing signal strength when your ready for that.

SPACECRAFT  Yeah, go ahead, John.

CAPCOM      Okay, Bruce, the reason is first of all let me tell you this is normal on every flight and that is that back on Al right now your transponder switch is selected to transponder 1 when in fact we have the Comm on transponder number 2. And as a result you're looking at the signal strength of the transponder that is turned off.

SPACECRAFT  Okay, I understand if I want to check that leaving the command panel switch in command so that I don't actually change the transponder selection, I can flip the switch over to transponder 2 and see if it works.

CAPCOM      Roger, you can do that, Bruce, but we would not want you to do that because we would only want you to do that if you had to do it to change configuration of your Comm, and then you could check for the signal strength.

SPACECRAFT  Houston, we're right over head the Cape, we can see all the runways and everything very well, landing site.
CAPCOM Roger that, Vance.

CAPCOM Challenger Houston, we would like you to take incryption back to TR, were switching from MILA back to TDRS.

SPACECRAFT Go back to TR, John?

CAPCOM That's affirmative, Bruce.

CAPCOM Challenger, Houston, back with you with TDRS.

SPACExECRAFT Loud and clear, John.

CAPCOM You're loud and clear too, Bruce.

SPACECRAFT Hey, John, tell us if you get any phone calls from people in Houston that saw the Orbiter. It ought to have been ideal because the city was kind of dark and we were in bright light.

CAPCOM Roger, that.

SPACECRAFT Just a shade to the south.

CAPCOM Roger that, Bob, you guys really looked good when you went by.

SPACECRAFT I guess.

CAPCOM Roger.

SPACECRAFT He doesn't have green numbers, he has white numbers.

PAO This is Mission Control Houston, at 1 day, 0 hours, 23 minutes, mission elapsed time. Back in communication with the Challenger through the Tracking Data Relay Satellite, during the last pass over the continental the United States, the crew reported passing right over the Houston area, and they could look down and see the causeway leading out to Galveston, and then very shortly thereafter, a few minutes later as they passed over Florida, they passed over the Cape area. Looked down upon their launch site, and hopefully their landing site at the normal end of the mission. Spacecraft is on orbit #17 out over the mid-Atlantic right now.

END OF TAPE
PAO Spacecraft is on orbit number 17 out over the mid-
Atlantic right now.

CAPCOM Challenger, Houston. Be advised in the next 12
minutes here of TDRS we may have antenna blanking so comm may be
in and out on that but UHF through Botswana will be good.

CAPCOM Challenger, Houston. We're going to be going LOS
TDRS here in 3 minutes. In case we get blanking, just a reminder
when we do go LOS to put the encryption to bypass.

SPACECRAFT Okay, John. We copy. Encryption to bypass.

CAPCOM Roger, that.

PAO This is Mission Control, Houston, at 1 day, 0 hours
56 minutes mission elapsed time. The Challenger has just passed
out of the range of the tracking data relay satellite on orbit
17. And the crew is still running, or the crew has initiated the
ACES experiment and that is running itself in the middeck. The
ACES is the acoustic containerless experiment system. A
forerunner or a test device of a materials processing capability
that could be developed in the future based on using sound waves
to hold samples of materials out away from the containers as they
are processed in a furnace. That concept has been tested only in
a very limited way on the ground and this will be its first test
on the space shuttle. The crew timeline today has had deleted
from it all the activities having to do with the flight day 2
deployment of the PALAPA - the Indonesian Communication
Satellites including all of the remote manipulator system
activities and the related photo TV activities. In place of
those PALAPA deployed television activities there'll be some
cabin television of the Cinema 360 activity and Earth views over
the Goldstone and Mila stations. Other activities today include
the activation of the SPAS-01 and the checkout and the activation
of the MOMS experiment on the SPAS. A check of the status of the
Monodisperse Latex Reactor. Some of the experiment activities
which were scheduled for a little later in the flight were moved
up today to take advantage of the available time created when it
was decided not to deploy the PALAPA today. That decision is to
allow time for the engineers who work on the PAM, the Payload
Assist Module which is the upper stage used by both the PALAPA
and the Westar, to have an opportunity to review the condition
and the assessed help of the Payload Assist Module for the PALAPA
and to have every confidence that they would feel comfortable
with a deploy of that satellite at its backup opportunity on
orbital number 32. As you know, there was some difficulty with the
Westar Satellite after its deployment from the Shuttle. It's not
yet fully understood what happened to that as it was preparing to
be boosted on its way to geosynchronous orbit. It is still not
completely certain where that satellite or its remanence are. We
are about 3 and 1/2 minutes away from acquisition through the
Yarragadee station in Australia. At 1 day, 1 hour mission elapsed time this is Mission Control, Houston.

END OF TAPE
PAO -- station in Australia. At 1 day, 1 hour, mission elapsed time, this is Mission Control Houston.

CAPCOM Challenger, Houston's with you at Yarragadee for 8 minutes.

SPACECRAFT Okay, we copy you, Houston, loud and clear. One question on the ACES.

CAPCOM Roger, go ahead, Ron.

SPACECRAFT Yeah we're about to deactivate the ACES, I just wanted to confirm with you that the colored status lights are the correct ones during the activation. We have exactly the same lighting we had before, that is all lights on except for the L2 and we're about to deactivate it from that configuration, over.

CAPCOM Roger, that's the correct status, Ron, you're go to deactivate it.

SPACECRAFT Okay, thank you, John.

CAPCOM Roger that, and thanks for all the good work, Ron.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Roger, the I IES (garble) auto sequence, should I put this switch in the OFF position, the procedure does not show that, but I'll put it in there if I should.

CAPCOM Roger, Ron. Would you repeat your question again please.

SPACECRAFT Roger, John. I was questioning about the IES switch position, it's ah, the experiment has completed it's auto sequence and I was questioning whether I should put the switch back into the off position? It's still in the on position at this time.

CAPCOM Roger, Ron. You can leave the switch on.

SPACECRAFT Okay, and we do have the barberple talkback as expected.

CAPCOM Understand.

SPACECRAFT Hey, Houston Challenger, we appear to be looking down on a rather large brush fire in Australia at the moment.

CAPCOM Roger understand.
CAPCOM Challenger, Houston, we're going LOS in 10 seconds, we'll see you at Hawaii at 1+29.

SPACECRAFT Roger, Houston. We'll see you there, John.

CAPCOM Roger that, Hoot.

CAPCOM Challenger, Houston's with you at Hawaii for 8 minutes.

SPACECRAFT Roger, John.

CAPCOM Roger, and if you could just verify that you have incryption in bypass.

SPACECRAFT Thank you, no we did not have it in bypass.

CAPCOM Okay, thanks a lot, if you could put it there for us.

SPACECRAFT Houston, Challenger.

CAPCOM Roger.

SPACECRAFT I was just in the middle of the in the MLR step 2 procedure, and the thought just occurred to me, these TV scenes you have coming up, call for some treadmill exercise. I would think that - don't those two activities conflict with the (garble) requirements? Over.

CAPCOM Roger, we'll look at it, Ron. We didn't think they did, but we'll look at it, we understand your question.

SPACECRAFT And John, also relating to the TV, let me just see if I understand correctly, the scenario here. We're going to be doing at approximately 3+00, our Hawaii pass, and for the Hawaii pass you want to cover with ground control of the cabin camera of the middeck, the activities including the cinema 360 shot of Bob on the treadmill, and then when we pick up at Goldstone, you're looking for the Earth views of the TV scenes through Goldstone and MILA on that same pass. Is that correct?

CAPCOM Roger that, Bruce. That's exactly what we want.

SPACECRAFT Okay, we got you.

CAPCOM And that will be the Hawaii 3+05 is when AOS will be.

SPACECRAFT Okay, thank you very much.
SPACECRAFT: What say we let Bob get on it, start it running now, so that he will be in good shape and all warmed up by 3:05.

CAPCOM: Roger, understand, good plan.

SPACECRAFT: No it's not a good plan.

CAPCOM: Challenger Houston, to get back to your question, you are go to do the MLR and the treadmill at the same time.

END OF TAPE
CAPCOM Roger, understand. Good plan.

SPACECRAFT No it's not a good plan.

CAPCOM And Challenger, Houston. To get back to your question. We, you are go to do the MLR and the treadmill at the same time.

SPACECRAFT Okay, thanks a lot, John.

CAPCOM Roger, that.

SPACECRAFT They had me setting up for 360 but it looks like it calls for Ron to actually operate the camera and he's had Ron setting up the TV when it looks like it calls for me to do the stuff on the flight deck.

CAPCOM And Challenger, your last transmission was hot mike.

SPACECRAFT Sorry about that. Thank you.

CAPCOM That's okay. No sweat.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT We have the MLR step 2 complete. That MET 1 day, 1 hour, 36 minutes.

CAPCOM Roger, copy, and we're going LOS here in 30 seconds. We need the encryption to TR. See you on TDRS.

SPACECRAFT Okay, we copy that, John.

CAPCOM Thanks a lot.

CAPCOM Challenger, Houston is with you TDRS.

SPACECRAFT Roger, Houston.

PAO This is Mission Control, Houston, at 1 day, 1 hour, 39 minutes mission elapsed time. Challenger within the range of the tracking data relay satellite on orbit number 18. We will be delaying the Change-of-Shift Press Conference for the off-going Flight Director Randy Stone that would have taken place at 9:30. We will be slipping that to 11:00 a.m. Central time. The reason for that is so that Flight Director Stone can continue to work here in the Control Center and run the shift, the regular routine work of the Flight Controllers here while the on-coming Flight Director, Harold Draughon, who would be working the
deployment of the PALAPA Satellite can do some off-line planning without having to be caught up in the routine running of the shift. That is some planning not just for the potential or probable deploy of the PALAPA on orbit number 32 but also to consider the option of a further one-day slip in that deploy activity to give the people who own that satellite if they choose to take it. That hasn't been done yet. This simply a planning exercise and Mr. Draughon will remain working on that for a couple of hours or another hour and a half while Randy Stone, the current Flight Director, runs the shift. His Press Conference, again, will be delayed. Instead of it in 9:30 planned time it will be scheduled for 11 a.m. central time this morning.

SPACECRAFT Houston, this is Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Say, John, on this next PAM ACE thermal check do you want it over a particular station or do you just want me to initiate it at 150?

CAPCOM Roger. Bob, 150 will be fine. We're over TDRS.

SPACECRAFT Okay, and you're saying everything twice for some reason now.

CAPCOM Understand, Bob. We just answered once. If you heard it twice - how do you read now?

SPACECRAFT Still giving me double talk.

CAPCOM Roger, we will work it from this end.

SPACECRAFT That's about a 2 or 3 second delay between the first time you say something and the second time you say it.

CAPCOM Roger, and we are receiving you that way now also.

CAPCOM Challenger, Houston. Radio check. How do you read now?

SPACECRAFT That's better, John. It's all fixed.

CAPCOM Roger. It was a simo TDRS and UHF also. That was our problem.

SPACECRAFT Okay.

END OF TAPE
First time you say something, and then 2nd time you say it.
Roger, and we are receiving you that way now also.
Challenger, Houston, radio check, how do you read now?
That's better, John, it's all fixed.
Roger, it was the simo, TDRS and UHF also, it was our problem.
Okay.
Since you're getting data, I'm just going to go ahead and do this (garble) thermal check now.
Roger, we're ready for the thermal check, Bob.
Okay, there's your data, I'm going to terminate.
Roger, looks good to us.
We're seeing you again, Houston.
Roger that, how does the Ellington runway look today?
Challenger, Houston.
Hello, Houston, (garble).
Morning, have a couple of notes for you when you are ready to copy.
Okay, stand by.
We're standing by.
Throw her back, she's too small. Go ahead, Mary.
Okay, ready to rip. We have a - Would like to request the startrackers be put back to track now. And have a change for the MLR status that was given to you in the CAP update. We would like that MLR status report, step 3, moved from where it was in the CAP update at 1 day 2 hours 30 minutes, to 1 day 3 hours 15 minutes, after Hawaii TV, over.
Okay, we copy, we're going to get the startracker to track and MLR status moves to 1/3:15 after Hawaii TV.
CAPCOM That's affirmative, Bob.
SPACECRAFT Startrackers are in track.
CAPCOM Copy, thanks.
CAPCOM Challenger, Houston.
SPACECRAFT Roger, go ahead, Mary.
CAPCOM Roger, Vance, the SPA's team down here is real curious about how their piece of equipment is going.
SPACECRAFT What team did you say, Mary? Were you referring to Dr. Spock?
CAPCOM That's negative, referring to SPA's, and the SPA team was wondering how the activation was going?
SPACECRAFT Okay, Mary, we're working on it late.
CAPCOM We copy that, and that's fine.
CAPCOM Challenger Houston, we're about 40 seconds LOS through Botswana, does not look like we will reacquire TDRS, so we would like you to go to bypass on your incryption at this time, and we'll talk to you through Yarragadee at 2+40.
SPACECRAFT Okay, bypass.
PAO This is Mission Control Houston. Loss of signal through Botswana voice relay station. Reacquisition expected in 9 minutes through Yarragadee, Australia, on orbit 18 for Challenger, flight 41-B. The crew currently revamping the days flight plan activities, to compensate for a no go on deploying the Palapa satellite. Activation of the shuttle pallet satellite and some check on activities with that satellite, and some other items of the flight plan move farther up to fill in the time, until the decision is made on deploying Palapa at the backup opportunity.

END OF TAPE
Currently Challenger in an orbit measuring 165.5 at perigee and by 170.6 at apogee. Those are nautical miles. Period of orbit 1 hour, 30 minutes, 51 seconds. Reacquisition through Yarragadee in 8 minutes. At 1 day, 2 hours, 32 minutes this is Mission Control, Houston.

Challenger, Houston. With you through Yarragadee for 5 minutes.

Challenger, Houston. With you through Yarragadee for 4 minutes.

Okay, Mary.

Got you loud and clear, Vance.

Houston, Challenger.

Challenger, Houston.

Mary, how long is the pass, this upcoming pass at Hawaii. How many minutes?

Challenger, Houston. It's about 8.5 minutes.

Okay, thank you.

Any time.

Challenger, Houston. We're at 30 seconds LOS. We'll talk to you again through Guam at 2 plus 52.

Roger.

Challenger, Houston. With you through Guam for 7 minutes.

Roger, Mary. We've got you through Guam. Got a question for you on the SPAS.

Go ahead.

Okay. In the activation now, are we expecting to see the pressure on the MOMS readings zero.

Standby. We'll check on that for you.

Challenger, Houston.

Go ahead, Mary.

Roger. That pressure on, the pressure on the
MOMS. That will equal zero is the MOMS is off. We'd like you to let us know where you are in the activation checklist so we can keep in touch with you.

SPACERCAFT: Okay. We are just completed on the activation, Mary, getting ready to go into checkout.

CAPCOM: Okay, we copy that. Thanks.

CAPCOM: Challenger, Houston With a delta to your activation checklist for page 2-4 when you're ready to copy.


CAPCOM: Roger. On that top line, panel Arr, that change the S-band FM antenna switch. We would like you to hold that until you get a call from us and that'll be after Hawaii.

SPACERCAFT: Okay. I'll hold on that, Mary.

CAPCOM: Thanks. And also we're done with the encryption tests for today and we'll probably get back to them tomorrow but we're happy with what we've got for today and you can just stay in bypass for the rest of the day.

SPACERCAFT: Okay. We'll stay there, Mary. Thanks.

CAPCOM: Challenger, Houston. We're about 40 seconds LOS here at Guam. We'll see you through Hawaii at 3 plus 05 and we repeat we'll be taking live TV at that time.

SPACERCAFT: Roger, 3 plus 05.

CAPCOM: Challenger, Houston, with you through Hawaii for about 8 minutes.

SPACERCAFT: Roger, Mary. Read you loud and clear. You receiving the picture yet?

CAPCOM: Negative on the picture. Oh, we got a great picture. Sounds like, looks like it's a great place to go running.

SPACERCAFT: Okay. Yes Bob, first Army Officer in space, you know, likes to do a lot of jogging and all that so Bob is jogging on the treadmill. Ron McNair is going to take some movies of him. He has the Cinema 360 camera. Ron is, you know, very professional in his job of movie making and we call him Cecil B. McNair. Anyway I think Ron is, you know, not pointing right at Bob --

END OF TAPE
SPACECRAFT Yes, Bob, the first Army Officer in space, you
know, likes to do a lot of jogging, and all that, and so Bob is
jogging on the treadmill. Ron McNair is going to take some
movies of him, he has the Cinema 360 camera. Ron, you know, is
very professional with his job of movie making, we call him Cecil
D. McNair. Anyway, I think Ron is, you know, not pointing right
at Bob, because that is such a wide field of view lens, that it
actually takes in about 1/2 of the room. Ok, I guess they are
going to shift gears now. Ok, Mary, as you may have noticed, we
do have the Cinema 360 camera, we do have an extremely wide field
of view. This camera can take anything within 180 degrees by 360
degrees. What we're trying to do is document the mid-deck
activities as we see - e x p e r i e n c e it here in orbit. We're trying
to document some of the food preparation, the running, and all of
the activity that takes place during the course of a mission.
This movie will be put together for (garble) Cinema 360 and will
be distributed to planetariums throughout the country. The
treadmill that Bob was running on, as you perhaps will recognized
as one of Bill Thornton's inventions and we're using it to good
use here. Any way we're very busy on the set today, as you can
tell, and we have a lot of scenes left to film with the Cinema
360, both here in the middeck and in the payload bay. And with
that I will send you back up to Bruce, who is operating the audio
and camera stations, video stations from the flight deck and
Bruce would like to say what he's doing up there. Bruce. Thank
you, Ron. Up here on the flight deck, we're getting the TV
cameras configured for the next live TV pass when we come over
through Goldstone. I think you can see on the map here, if I can
just let it float in the air for a minute. We're going to be
coming in across the island Guadalupe, Baja California, down
through Mexico and across the Yukatan Peninsula, in the vicinity
of the island of Cashemel. We'll have live comm coverage roughly
in this area, and then a slight drop out, and then through the
MILA or the Merritt Island station we ought to be able to give
you some coverage of the Yukatan Peninsula, Cashemel and a little
more of the Gulf of Mexico area. The preparations here are going
well, we're still in the dark right now. We expect to be
crossing the terminator and coming into sunrise, virtually any
moment now. Looking out through the window into the payload bay,
I can see the payload bay starting to light up as the sun rises
in the east. And Mary, Hoot is working on the SPAS satellite, as
you can see, he's working on the panel over on the right side of
the spacecraft, and of course, you've been in contact with him
about that. So let's switch the scene down below, and go down
and see what's happening down there. Ok, guys, ready on the
set.

CAPCOM I like your hat, Ron.

SPACECRAFT We thought before we tail off on this pass over
Hawaii and just before we pick you up over the states, that we
would get everybody downstairs.
CAPCOM          You guys all look like space really agrees with you.

SPACECRAFT     Yes, it's really agreeing with me, I know, and I think everybody else - convenient up here for getting around. So with that, why don't we sign off and we'll see you in a few minutes, show you a little bit of what the ground looks like to us.

CAPCOM          That's fine, thanks a lot for the show. Sure does look like fun. Challenger, Houston, got a good shot of you up on the flight deck, and we'll keep control of the cameras for the rest of the pass. Thanks a lot.

SPACECRAFT     Ok.

END OF TAPE
SPACECRAFT Houston, Challenger
CAPCOM Challenger, Houston.

CAPCOM We'll check on it for you.

SPACECRAFT We're just coming into the daylight now, and we're starting to get a good view of the earth with our TV cameras.

CAPCOM Roger, we can see the sun coming in through the window, and we're ready when you are, Hoot.

SPACECRAFT Okay, pressing on that step 3 measure.

CAPCOM Copy that, and you look blue.

CAPCOM Challenger Houston, back with you through TDRS now.

CAPCOM Okay, Mary, we've got you through TDRS.

CAPCOM We're having a good time watching Bobby take, trying to film something through the top windows.

SPACECRAFT Houston, this is Challenger, through Goldstone, how do you read?

CAPCOM Got you loud and clear, Bruce, how me?

SPACECRAFT Very good, Mary, you getting the TV signal, we've got a shot looking straight down at the Pacific Ocean.

CAPCOM Roger that, we're getting good color TV of earth views.

SPACECRAFT Roger, we should be coming up on the Island of Guadalupe here shortly, in fact, right to the right field of view, to your left should be out of the (garble)

CAPCOM Roger that, we see land.

SPACECRAFT You see Guadalupe off our starboard side, it would be either off the left edge or right on the left edge of your image.

CAPCOM Roger, that Bruce, we've lost lock on TDRS, we're off the nose now for a couple of seconds though we should get you any time now.
SPACECRAFT: Okay, and we're ready you in double with the echo, guess you must be coming through TDRS and Goldstone simo again.

CAPCOM: Roger that, that's simo. And we've got a good picture again.

SPACECRAFT: Okay, and in about 2 seconds we'll be coming up on Baja, we have it in view now, and should be on your camera shortly, Baja California.

CAPCOM: I think we tally Baja up there.

SPACECRAFT: Here it comes. Looking at the coast line of Baja California, and it appears to us to be about the level of -- with the naked eye we can see some fields, straight down, green squares, not too much of that down there, since it's a fairly dry area though.

SPACECRAFT: Should be crossing the Mexican coastline here shortly in the vicinity of Los Mochos.

CAPCOM: Copy that.

SPACECRAFT: Houston, Challenger. Mary, I've got something for you in the way of the interrogator.

CAPCOM: Ready to copy.

SPACECRAFT: Okay, I'm not showing any signal strength on S-band payload on interrogator number 1, I don't have a lock, and I'm showing no transmitted power over on Spec 62, that's on interrogator 1. I guess we could try interrogator 2, but I'll stand by and see what you want to do.

CAPCOM: Okay, we'll check on that for you.

SPACECRAFT: We're coming up over the Sierra, Madra, Oyster, or western Sierra Madra Mountains. You can probably also see if we give you a shot of the cabin camera, Bob is busy taking Hasselblad photos and we're trying to document some of this stuff for the Earth Obs folks.

CAPCOM: Roger, copy that Bruce, and for Hoot, INCO's data concurs with yours and he's trying to figure something out for you.

SPACECRAFT: Okay, thanks Mary, I'll stand by then. And Mary, we see a contrail down below us, matter of fact I see 2 or 3 of them. Bruce is going to try to zoom in on one of them. An airplane flying a little bit below us there.

CAPCOM: Roger that.
SPACECRAFT  Mary, while I'm talking to you, one more thing on the MOMS, when I did the system checkout a couple of minutes ago.

SPACECRAFT  Hey, Bob,

SPACECRAFT  I suspect because we were in the dark.

END OF TAPE
SPACECRAFT  Okay, thanks, Mary. I'll stand by then. And Mary, we see a contrail down below. As a matter of fact, I see 2 or 3 of them. Bruce is going to try to zoom in on one of them. An airplane flying a little bit below us there.

CAPCOM  Roger, that.

SPACECRAFT  Mary, while I'm talking to you. One more thing on the MOPS. When I did the system checkout a couple of minutes ago, I suspect because we were in the dark we didn't get any, any video output in that check. We show the same readings that we have with, get about the same thing put into, into run. Mary, if you did notice that --

CAPCOM  Copy that and we'll check on it.

SPACECRAFT  Mary, (garble) notice that when we resume during that contrail you could see both the contrail and its shadow on the Earth displaced someway, some distance due to the sun angle.

CAPCOM  Roger. We could see that real well, Bruce.

SPACECRAFT  Okay. And now, Mary, we're coming up on the Sierra Madre (garble) or Eastern Sierra Madre and then cross into the Gulf of Mexico right about Tampico and I think that's Tampico right below us.

CAPCOM  Roger that, and for Hoot. Payloads concurs with your assessment on the MOPS.

SPACECRAFT  Okay, great. Thank you, Mary.

SPACECRAFT  You should be seeing Tampico on the monitor now.

CAPCOM  Challenger, Houston. For Hoot, on your Payload interrogator we'd like you to verify that you have 301 set in on the thumbwheels. Over.

SPACECRAFT  Yes, that's affirmative, Mary. Both on 1 and 2.

CAPCOM  Copy, thanks.

CAPCOM  Challenger, Houston. We're going to be looking at the Payload Bay with camera A.

SPACECRAFT  Okay, you've got camera A, Mary.

CAPCOM  Thanks.

SPACECRAFT  And we're coming over the Western coast of the Yucatan Peninsula at this time, Mary.
CAPCOM Copy that, Bruce.

SPACECRAFT And we're coming up now on the island of Cozumel.

CAPCOM You should be seeing some good blue water.

SPACECRAFT Yes, it really looks beautiful down there.

SPACECRAFT Mary, are you still with us?

CAPCOM We're still here.

SPACECRAFT Roger, and at 3:15 we were on TV but the MLR status check at 3 plus 30 is go. Everything looks good.

CAPCOM Thanks. Sounds good.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM Roger. We'd like to request that you power up the MOMS at this time. We just, we just would like to let it warm up and get ready for its data take on orbit 20.

SPACECRAFT Okay, will do that, Mary.

CAPCOM Copy. Thanks.

SPACECRAFT Houston, Challenger. We need to go back to payload umbilical and then I guess check out the (garble) later.

CAPCOM Challenger, Houston. We concur with that.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Okay. Yes Mary, we had to go back to the payload umbilical to command the MOMS so that's where we're sitting right now. And we've got power on, that data take, is that right, that you're going to take from down there?

CAPCOM That's affirmative.

SPACECRAFT Okay. Well I guess we'll hold where we are then until we hear back from you, Mary.

CAPCOM Challenger, Houston for Hoot.

SPACECRAFT Go ahead, Mary.
CAPCOM      Hoot, they don't need that payload on umbilical until they're ready for the MOMS data take which is about a rev from now. So if you'd like to, you can go ahead and work on the RF. You're go to switch to payload systems 2 and you can check the procedure on page 2-5 of your Payload OPS Checklist.

SPACECRAFT  Okay. Sounds good, Mary. We'll go ahead and we'll try that using interrogator number 2.

CAPCOM      Concur.

END OF TAPE
SPACECRAFT Okay. Sounds good, Mary. We'll go ahead and we'll try that using interrogator number 2.

CAPCOM Concur.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Mary, we thought at first that we were going to get them to work on interrogator number 2 but we only are showing about .4 volts output on the S-band payload signal strength. That's up on the meter on Al.

CAPCOM Copy.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Yes, Mary. Let me tell you what we did. When we switched over to try interrogator number 2 we did not go to system 2, go through the payload umbilical and then go to interrogator and try to get the interrogator up on system 2 and we show the system in here trying to talk on PSP number 1 and the way we see it, we think you ought to be over on PSP number 2. Do you think we need to go back to payload umbilical, get them over there and then try the interrogator?

CAPCOM Check on that for you. Stand by.

CAPCOM Challenger, Houston, for Hoot.

SPACECRAFT (Garble) Mary.

CAPCOM Roger. On your payload interrogator it looks like both your PSP and PI are in 2 to us so your configuration looks good. We'd like you to try a switch throw for us on panel Al. The S-band payload transmitter power - we'd like you to take that to medium. Over.

SPACECRAFT Okay, we'll take the transmitter power to medium.

SPACECRAFT Okay, Mary. We show transmit power out on Spec 62 now. We still don't have a phase lock.

CAPCOM We copy that and no phase lock.

SPACECRAFT And Mary, to add a little more information to that, that still makes - we've improved Spec 62 and so transmit power on there now but our signal's trying to come up on Al still carries only about .4 for the payload signal strength.
CAPCOM   Roger. We copy 0.4 on the signal strength.

PAO    This is Mission Control, Houston. Approximately 10
minutes remaining in this tracking satellite pass on orbit 19.
Flight Director Randy Stone will be running anywhere from 5 to 10
minutes late in arriving at the Newscenter for his Change-of-
Shift Press Conference. Earlier this pass a little bit of a
sight seeing tour over Baja California, Mexico and in the payload
bay OMS PODS and other details of the Orbiter Challenger. While
the crew was describing Cozumel that we could not see because the
camera was pointed at the interior of the payload bay. The
flight crew having completed their preliminary checkouts of the
SPAS, Shuttle Pallet Satellite, and its intended experiment. At
day 1, 3 hours, 57 minutes. Mission Control, Houston.

CAPCOM   Challenger, Houston.

SPACECRAFT   Go ahead, Houston.

CAPCOM   Roger. We're seeing some conflicting status here
on the right DDU circuit breakers. We were wondering if you
could just check 2 circuit breakers for us on panel 15 and 16.

SPACECRAFT   Sure, go ahead.

CAPCOM   Panels 15, row Echo. Panel 16, row Echo. The DDU,
right DDU circuit breakers. We just want a status.

END OF TAPE
CAPCOM: Panel 15, row Echo; Panel 16, row Echo. The DDU, the right DD circuit breakers, we just want a status.

SPACECRAFT: Okay, you have an echo again, we understand row Echo on the overheads. The circuit breakers.

CAPCOM: That's affirmative, the right DDU circuit breakers.

SPACECRAFT: The right, both right DDU circuit breakers are pulled, the afts are pulled and the lefts are in.

CAPCOM: Roger, we copy, thanks a lot for checking.

CAPCOM: Challenger, Houston, for Hoot. Would you pull your Payload Ops Checklist and go to page 2-4, we would like you to get you to do an action on the back panel.


CAPCOM: Okay, in the middle of the page, we would like you to sweep that frequency antenna, it's the indented starred, three lines there, and actually all you have to do is do a frequency sweep, make sure you hold it on for 34 seconds, or until you get a lock. It's a frequency sweep, S-band payload on panel All. And we're going LOS Botswana, if we don't pick you back up through TDRS we'll get you through Guam at 4 27.

CAPCOM: Challenger, Houston, with you through Guam for 8 minutes.

SPACECRAFT: Hello, Houston. We've got you loud and clear.

CAPCOM: You're loud and clear too. Nothing for you. Challenger, Houston, I have a question for Hoot on his S-band payload sweep.

SPACECRAFT: Okay, go ahead, Mary.

CAPCOM: Roger, Hoot, we would like to know if anything happened when you executed that previously and we would like to ask you to do a 34 second frequency sweep again while we've got data, over.

SPACECRAFT: Okay, I guess that must be the transmission we missed, Mary. We had gone to page 2-4 and you were going to tell us to do something then, and that was all we heard from you.

CAPCOM: Okay, we assumed that you would go ahead, gone ahead an executed that. We would like you to go to Panel All and execute a frequency sweep, 34 seconds on or until you get lock, over.
SPACECRAFT  Okay, we'll do that. Okay, we got them with a sweep, we got a fail on that.

CAPCOM  Challenger, Houston. Hoot, we concur with that and we're looking at it.

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead, Mary.

CAPCOM  Got one more configuration change for you to do to set up this RP. We would like you to go to spec 221 and do an item 1, we need PSPL1 enabled, over.

CAPCOM  Challenger, Houston, for Hoot, we're seeing PSP lock, you look good, so we would like you to go back to normal configuration. Take your S-band payload switch on panel ALL, transmitter power back to low.

SPACECRAFT  Okay, Mary, we're back in low.

CAPCOM  Copy, thanks a lot, INCO seems real happy with your configuration here.

SPACECRAFT  Okay, we are too.

CAPCOM  Challenger, Houston, we're 30 seconds LOS on Guam, and we'll talk to you through Hawaii at 4 + 42.

SPACECRAFT  Okay, Mary, see you in a little bit.

CAPCOM  Challenger, Houston, with you through Hawaii for 8 minutes.

SPACECRAFT  Hey, Houston, you are loud and clear.

CAPCOM  Got you loud and clear too.

SPACECRAFT  And Mary, we're up to step 4 in the stars checkout, and we thought we ought to hold here until we found out how close your MOM and data take was. That would be the deploy mode activation of DDU checkout and so forth, which takes, oh, probably at least a half hour to get through all that.

END OF TAPE
SPACECRAFT  Mary, we're up to step 4 in the SPAS checkout, and we thought we ought to hold it here until we found out how close your MOM and data take was. That would be the deployed mode activation and DCU checkout and so forth which takes, oh probably take us at least half an hour to get through all that.

CAPCOM  Roger, that.

SPACECRAFT  So, where we stand right now is, we're holding on that until you tell us to go ahead with it.

CAPCOM  Roger. We understand you're holding and we're discussing the go now.

SPACECRAFT  And Mary, just to make sure, we didn't understand your last statement. You're going to tell us when to proceed.

CAPCOM  That's affirmative. Please hold while we get organized here.

SPACECRAFT  Okay, thanks. We're standing by.

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead, Mary.

CAPCOM  Roger. Hoot, we'd like you to go back to umbilical now so we can do the MOMS data take.

SPACECRAFT  Okay, we'll go back to the umbilical.

CAPCOM  Copy, thanks.

SPACECRAFT  Okay, Mary. We're going to go back to the payload umbilical. I believe we'll have to go back to CSP 1 and also change our PDI detail (garble) do you concur?

CAPCOM  We concur with that.

SPACECRAFT  Okay Mary. You should be there over on the umbilical system 1.

CAPCOM  Copy that.

CAPCOM  Challenger, Houston. Hooter, we need you to go back to spec 221 and execute another item 1 for us.

SPACECRAFT  Okay, great. Thanks, Mary.

SPACECRAFT  Houston, Challenger. What's the approximate MET of your MOMS data take in case we have time to look over your shoulder?
CAPCOM Challenger, Houston. Your ground commanded MOMS data take times will begin at MET 1/05:17:17 and run for 48 seconds. We're going to drop you for 30 seconds here while we hand over to TDRS.

SPACECRAFT Okay. We copy that, Mary.

CAPCOM Challenger, Houston. Back with you through TDRS.

SPACECRAFT Okay, Houston. We've got you loud and clear.

CAPCOM Got you loud and clear too.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Houston.

CAPCOM We're complete with the MOMS data take and we'd like you to resume the RF checkout if you go to page 2-4 and start up with step 3 and run through that procedure.

SPACECRAFT Okay, Mary. We copy that.

CAPCOM And Hooter, if you have trouble locking up we'd like you to just go ahead and execute the note on page 2-4.

SPACECRAFT Okay.

SPACECRAFT Houston, Challenger. We're going to do this PI SPAS RF activation with interrogator 2 if you concur.

CAPCOM We'll check on that.

CAPCOM Challenger, Houston. Ron, we concur with that.

SPACECRAFT Okay. Thank you. Mary, how do you read this comm? I hear some static and breaking up on this end.

CAPCOM Roger we get a little static and you're slightly broken on this end too.

CAPCOM Challenger, Houston.

SPACECRAFT Okay, Houston.

CAPCOM Roger, have a minor addition to your EMU checkout for today, a request we got.

SPACECRAFT Houston, Challenger. Go ahead.

CAPCOM Roger. When you do the EMU checkouts on 1 and 2 and also EMU 3 if you perform that checkout today, we would like
to have you read and record the EMU status list airlock pressure during that EMU — —

END OF TAPE
CAPCOM Roger. When you do the EMU checkouts on 1 and 2 and also EMU 3, if you perform that checkout today, we would like to have you read and record the EMU status list airlock pressure during that EMU checkout and report it down to us. We want to make sure that we can accurately set up your 10.2 cabin.

SPACECRAFT Okay, understand. In performing those procedures you'd like to have airlock pressure read out.

CAPCOM Roger, that's off the EMU status list.

SPACECRAFT Roger.

SPACECRAFT Mary, this is Challenger. Understand that's airlock pressure from the DCM, over.

CAPCOM That's affirmative, Bruce.

SPACECRAFT Okay.

SPACECRAFT Mary, we're showing the same type of signature as last time. Unable to get signal strength above .43 or so. I tried a frequency sweep and that didn't help. At the moment I'm still in the low mode. We were in the medium last time. I'd like us to go back to medium unless you have another suggestion.

CAPCOM We copy. Just a second.

CAPCOM Challenger, Houston for Ron. We'd like you to go back up to the top of page 2-4 and make sure your switch configurations on the top of that page are complete.

CAPCOM Challenger, Houston for Ron.

SPACECRAFT Go ahead, Mary.

CAPCOM Ron, did you copy that we'd like you to go to page 2-4 of the checklist and start from the top of that page and in particular on panel A1L, we would like you to check that the S-band payload control switch is in panel, over.

SPACECRAFT Roger, Mary, I copy that and I did start at the top, at the top of page 2-4, I did start at the top of page 2-7 and are you reading me clearly?

CAPCOM That's negative. There's a lot of static, Ron.

SPACECRAFT Okay, Mary. I did start at the top of page 2-4 and got down to checking the signal strength and I did get the .43 volts and at that point I did the frequency sweep and that's where I am at the moment.
CAPCOM: Copy that and you are confirming that on panel A1L your S-band payload control switch is in panel.

SPACECRAFT: Negative, it's now in command. I took it to panel and then back to command. I can do that again if you wish.

CAPCOM: Roger, Ron. We'd like you to do that page again and yes we would like it in panel as per the checklist.

SPACECRAFT: Okay. We are configured in panel at the moment.

CAPCOM: Roger, we copy that.

CAPCOM: Challenger, Houston. You can start your sweep now, Ron.

SPACECRAFT: Roger.

SPACECRAFT: Okay, Houston. We did the sweep and momentarily got a phase lock and the appropriate signals (garble) strength. Immediately after we got a SPAS trans on the lock and the interrogator information on spec 62, over.

SPACECRAFT: Okay, Houston. Looking in here we have, I do note a configuration problem. The DECOM 4 for this check needs to be reconfigured to S-band 6. We will reconfigure that and try the check.

CAPCOM: Copy that.

SPACECRAFT: However, at this point that transponder lock, transponder lock message and this data dropout on spec 62 is not nominal.

CAPCOM: Copy, Ron, and INCO's looking at it.

CAPCOM: Challenger, Houston. Ron, we would like you to try another frequency sweep on medium. That's on panel A1 S-band payload transmitter power to medium and then a frequency sweep in 34 seconds.

SPACECRAFT: Okay, another frequency sweep coming up.

END OF TAPE
CAPCOM Challenger, Houston, Ron, we would like you to try another frequency sweep on medium, that's on panel A1, S-band payload transmitter power to medium, and then a frequency sweep of 34 seconds.

SPACECRAFT Ok, another frequency sweep, coming up.

CAPCOM Copy. Challenger, Houston, we're about 20 seconds LOS off of Botswana, if we don't pick you back up on TDRS, we'll get through Guam at 6:18, 6:04, correction.

SPACECRAFT Ok, we'll see you at Guam.

PAO This is Mission Control Houston, 15 seconds away from reacquisition of Challenger on the onset of X-bolt 21 through the Guam tracking station. We have AOS at this time.

CAPCOM Challenger, Houston with you through Guam for 6-1/2.

SPACECRAFT Roger, Houston, loud and clear. Houston, Challenger, at the present we stand on the SPAS checkout - step 5 SPAS PCU checkout. We did have some problems getting it locked. I ended up going back to system 1, interrogator 1, taking a look because I was unable to get a lock on system 2, in fact I was unable to receive data on the (garble). Anyway system 1 I did get good signals with, I did get a phase lock, I did get bit sync and the system appears to be working well. We apparently are seeing these problems with RF in the payload bay, but it looks like system 1 is working now, and we are proceeding with the checkout.

CAPCOM Roger, Ron, we copy all that, and I have a note for you in the CAP page 4-8.

SPACECRAFT Ok, go ahead.

CAPCOM Ok Ron, on 4-8, it references MOMS activities, obviously you've already performed step 1, we would like to delete the reference to steps 2 and 3.

SPACECRAFT Ok, delete MOMS step 2 and 3 on page 4-3, copy.

CAPCOM Roger.

SPACECRAFT Ok, Jerry, Step 5 is complete, beginning step 6 EMU checkout.

CAPCOM Copy that Ron, step 5 is complete. Challenger, Houston, we're 30 seconds LOS through Guam, be advised you have a teleprinter message onboard, message 11, weather update. We'll see you next in Hawaii in 7 minutes.
SPACECRAFT  Ok, Jerry, we'll check the message.
CAPCOM    Challenger, Houston with you at Hawaii for 8 minutes.
SPACECRAFT  Ok, Houston, we copy you loud and clear.
CAPCOM    Copy, Ron, and for the guys downstairs, we'd be interested in getting a status on the EMU checkout.
SPACECRAFT  Ok, Jerry, this is Bob, Ron's completed the checkout on (garble) and everything was nominal air lock pressure read 14.8.
END OF TAPE
CAPCOM       Copy Ron, and for the guys downstairs, we'd be
interested in getting a status on the EMU checkout.

SPACERRAFT    Okay, this is Bob, Ron's completed checkout on
(garble) everything went normal. All our pressure read 13.8.
Houston this is Challenger, do you copy?

CAPCOM       Roger, go ahead, we copy, Bob suit checked out
okay, standing by for Bruce's report.

SPACERRAFT    Okay, Bruce is still in work.

CAPCOM       Okay copy that, and are you guys intending to press
on with MU3, time permitting?

SPACERRAFT    Yeah, that's affirm we're going to do them all.

CAPCOM       Copy that.

SPACERRAFT    Jerry I might not get to cabin measurement VTH, done
today, we knew it was just a shopping list on it for today
anyway.

CAPCOM       Roger copy that, Bob, and when you get a chance
we'd like to know what the pressure readings were off the EMU
status list. And one further reminder, and won't have to talk to
you later, assuming both your suits check out well, we do not
want to do a water charge on EMU 3.

SPACERRAFT    Okay, we copy that. Okay, you ready to copy.

CAPCOM       Roger, go ahead.

SPACERRAFT    Okay, the suit pressure and (garble) was a,
(garble) Bob's suit was 0.7. Suit pressure and (garble) was
04.3. (garble) .4, water temp was 75, gas pressure, water
pressure 14.5, 14.4 and the suit did not leak at all.

CAPCOM       Copy that.

SPACERRAFT    And Jerry, the (garble) is working, the (garble)
check out, one question on that.

CAPCOM       Okay, Ron go ahead, we're having a little trouble
understanding, a little bit of echo to it, go ahead.

SPACERRAFT    Okay, on page 2-10, at the calling up spec 221, the
control mode came up 3, with a 3. I issued an ITEM 18 on top of
it, and we got a good hand (garble). At the present waiting for
the lock sim (garble). What I would like to know if you see
anything, other than issuing that command ITEM 19, on top of the
asterisk, did that cause the command with problems.
CAPCOM Standby, we'll ask payloads. Challenger, Houston, for Ron.

SPACECRAFT Okay, Jerry.

CAPCOM Okay, Ron, you can disregard the message that you got with response to your ITEM 19 EXECUTE, we'd like you to proceed on with step 8, on 2-10. After you've completed step 8, we'd like you to go back and reactivate the MOMS. It was turned off.

SPACECRAFT Okay, I'll do that, thank you.

CAPCOM Challenger, Houston, we're 20 seconds LOS at Hawaii. Be back with you in about a minute on TDRS.

SPACECRAFT Okay, we copy.

CAPCOM Challenger, Houston on TDRS.

SPACECRAFT Read you loud and clear Jerry. Okay Jerry, step 8 is complete.

CAPCOM Copy, step 8 complete. And a reminder to reactivate MOMS.

SPACECRAFT Okay, that's in work.

SPACECRAFT Jerry, at MOMS. Activation is complete.

CAPCOM Copy Ron, thank you.

SPACECRAFT Houston, Challenger, over.

CAPCOM Go ahead.

SPACECRAFT Ah, just curious, Jerry, we did a lot of switching back and forth from system 1 to system 2, because of the RF problems. (garble).

CAPCOM Okay, Ron, your lot of noise on the channel. I think you are asking us if we are happy with the configuration currently with the SPAS and do we want to go back and check out the other PI link.

SPACECRAFT Not exactly. I just would like to know (garble)

END OF TAPE
SPACECRAFT -- dropped out. He went back to 1 and I'm just curious as to what we have at this point.

CAPCOM Okay, Ron. Lot of noise on the channel. I think you're asking us if we're happy with the configuration currently with the SPAS and do we want to go back and check out the other PI link.

SPACECRAFT Not exactly. I'd just like to know if the system's good.

SPACECRAFT I'd just like to know --

SPACECRAFT Jerry, this is Hoot. What Ron was wondering is if you see the interrogator on system 2 as being any good.

CAPCOM That's affirmative, Hoot. We think it's good. We saw it locked up earlier and we're happy with your current configuration. Be advised you're coming through clear and Ron is awfully scratchy.

SPACECRAFT Okay, thanks, Jerry.

SPACECRAFT Okay, Jerry. How do you read me now? Is that any better? I still read some breaking up on this end.

CAPCOM Okay, Ron. You're much clearer now.

CAPCOM Challenger, Houston for Ron.

SPACECRAFT Go ahead.

CAPCOM Yes, Ron, can you tell us what you did to fix your problem.

SPACECRAFT Well, as far as I can tell, my problem isn't fixed yet is it?

CAPCOM Well, it's not now. It was clear that one time you talked.

SPACECRAFT I think we just hit the (garble) right.

CAPCOM Okay, you're still breaking up quite a bit.

SPACECRAFT Jerry, Ron's going to go try changing batteries and then he'll talk to you again. He changed about 4 hours ago.

CAPCOM Okay, Vance. Everybody else seems to be coming through quite clear. It's Ron that's got the problem.
SPACECRAFT  Okay, Jerry. I went and changed my batteries. It seems like that must have done the trick. These batteries apparently aren't as good as, well, they lasted about 4 hours. That's all I'll say.

SPACECRAFT  Houston, Challenger. Comm check. How do you hear?

CAPCOM  Roger, Ron. We got that loud and clear. You sound much better now. And Ron, for your information we've got a MOMS take coming up at 06 plus 50 and I've got a note for someone concerning water dumps this evening.

SPACECRAFT  Okay, Jerry. Go ahead on the water dump.

CAPCOM  Okay, Hoot. Water dump at 07 plus 30. Dump tank bravo to 20%. 2 0 %. That shouldn't be a problem with MOMS takes. Next one is considerably after that time.

SPACECRAFT  Okay, I copy that, Jerry. You want the water dump at 7 plus 30 and dump tank bravo to 20%.

CAPCOM  Good readback.

SPACECRAFT  And Hoot, just to verify that that MOMS data take is 7 plus 50.

CAPCOM  Challenger, Houston for Ron. That's at 06 plus 50.

SPACECRAFT  Oh, 6 plus 50. Thank you.

SPACECRAFT  Okay. Once more how do you hear Bruce and Bob.

CAPCOM  Challenger, Houston. Vance we're reading you on the ground.

SPACECRAFT  Roger. Okay. I'm going 296.8. Bruce you go Bravo vox and Bob, alpha vox and then I'll check in. Okay, EV1 and 2. How do you hear?

SPACECRAFT  Loud and clear.

SPACECRAFT  Okay. I'm staying 296 8. Bruce you go alpha vox, Bob bravo vox and we'll check in. After ... Okay. Read you loud and clear. How do you hear? Okay. Bob, I don't hear you quite so well. Please repeat that again. Okay, there's a little bit of background static. Not very much and by the way, I was hearing you. I had to key for you to hear but I was hearing when you were just shouting.

END OF TAPE
SPACECRAFT  I had to key for you to hear, but I was here when you were just shouting. And, Jerry, did you hear all of us on our radio check.

CAPCOM  That's negative, Vance, we're only copying your transmission.

SPACECRAFT  Okay, we'll have to check on it. Jerry, we just performed EVA Comm check and it went well. Of course, the EVA'ers can not hear you and you cannot hear them. I guess we'll have to check, but we're probably not in the full up configuration for that.

CAPCOM  Roger, that's to be expected with this check out, Vance. We'd have to hit another switch on, A1R. And that's not required for the (garble).

SPACECRAFT  Okay, fine. And I'm going back to simplex 2597 and EVA, EV1 and 2, and install how much no vent position and the check is complete.

CAPCOM  Challenger, Houston for Ron.

SPACECRAFT  Go ahead, Jerry.

CAPCOM  Okay Ron, referencing the cinema 360 set up that was on the shopping list items, in preparation for that tomorrow, we would like to make sure that there are at least 250 feet of film remaining on magazine one. If there is not, we would like you to change out magazine 1 and insert magazine 2 onto the camera in preparation for tomorrow.

SPACECRAFT  You want at least 250 feet of film left on magazine 1 and I take it that's the catch for the Palapa deploy.

CAPCOM  That's affirmative in preparation for that, and if you don't have that much, go ahead and change them out.

SPACECRAFT  Okay Jerry, let it stand, thank you.

SPACECRAFT  Houston this Challenger, over.

CAPCOM  Go ahead, Bruce.

SPACECRAFT  Roger, we've completed the checkout on EMU number 2. Essentially everything is okay. One item on unpacking the helmet mounted lights, Bob may have forgotten to mention is, the lens on one of the helmet mounted lights that he has mounted on his helmet is cracked. It doesn't appear to be a problem, it looks like it's just the outer lens. Also, a question, on page 1-3, on the EVA check, EVA checklist under airlock prep, when I went and turned the step 21, when I went and out the power
battery charger bus select switch to main B, I was reading approximately a 10th of an ampere, that's 100 milliamps, even though the EMU was still in the BATT position, I was curious as to whether that was normal, over.

CAPCOM Okay, Bruce, we copy that, we'll try to get you an answer on it. Understand this was EMU 1 or 2?

SPACECRAFT This was EMU 1.

CAPCOM Roger, copy, was your suit, and can you give us a pressure off of the DCM for the airlock.

SPACECRAFT I do, airlock pressure from the DCM was reading 14.7.

CAPCOM Roger, copy that.

SPACECRAFT And we have both left the batteries in our helmet mounted lights, I understand there is not, repeat negative signal for battery conditioning circuit in the lights, so it's safe to do so, over.

CAPCOM I understand that, Bruce, we'll get you an answer, I believe that is correct, we'll get you an answer.

SPACECRAFT Okay, and we have not, repeat not, done anything with the helmet mounted TV yet. Do you want us to install a battery and run some sort of check when we're over a ground station or something, and then take the battery back out, or just wait until EVA day, over.

CAPCOM Stand by, we'll get you an answer on that, Bruce.

It's okay to leave the batteries and the lights. There is a circuit but it's okay, there is no problem with it.

SPACECRAFT Yeah, it's going to be, you know, like 3 days before we use them, I wouldn't want to discharge the batteries.

CAPCOM We concur with that, Bruce, and the consensus down here is to not work with the EMU TV today.

SPACECRAFT Okay, we won't touch the EMU TV today, and I guess I didn't understand your reply on the helmet mounted lights. Do you want us to leave the batteries in or take the batteries out and put them back in later?

CAPCOM Okay, Bruce, you're go to leave the batteries in the lights.
SPACECRAFT (garble) copy. And we're going to get going on the EMU #3 checkout here as soon as some of the other middeck traffic thins out a little bit, it's pretty congested down here, right now.

CAPCOM We can just imagine Bruce.

END OF TAPE
CAPCOM We can just imagine, Bruce.

SPACECRAFT No you can't.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Challenger.

SPACECRAFT Okay. We got the MMR status check completed 7 hours, 14 minutes. Everything looks good on the MMR. Question on the AEM. The temperature yesterday of about 80 degrees and a temperature today of 85. Is that the expected trend on the AEM?

CAPCOM Ron, we'll get you an answer back on that.

SPACECRAFT Okay, thank you.

CAPCOM Challenger, Houston. We're 4 minutes LOS on TDPS. Guam is next at 07 plus 43 and for Ron, we don't have any immediate information, Ron, on temp trends or what is to be expected there. No immediate actions are required and we'll continued to monitor and try to get you an answer that's more definitive later.

SPACECRAFT Okay, just curious if 85 sounds a little bit high but it may be expected so I'll wait to hear from you.

CAPCOM Okay, Ron. Thanks.

CAPCOM Challenger, Houston, with you through Guam for 3 minutes.

SPACECRAFT Roger, Houston. We copy you.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead.

SPACECRAFT Yes. Jerry, got the water dump going. What do you think about running the fuel cell purge while we got the water dump going. Looking down to, I guess you have a MOMS data take coming up at some point.

CAPCOM That's affirm. I had about an 8 20 was the next one. We'll get you an answer, Hoot.

SPACECRAFT Okay, understand. 8 20 is your MOMS data take?

CAPCOM That's affirm, Hoot. That's an approximate time and you are go to proceed with the purge.

SPACECRAFT Okay, great. Thanks, Jerry.
CAPCOM Challenger, Houston. Going LOS at Guam. See you in 8 minutes at Hawaii.

SPACECRAFT Okay, Jerry.

CAPCOM Challenger, Houston, with you through Hawaii for 6 minutes.

SPACECRAFT Hello, Houston. Loud and clear.

CAPCOM Challenger, Houston. I've got 3 notes for you. One on MOMS OPS and 2 for the presleep.

SPACECRAFT Go ahead, Houston.

CAPCOM Okay. The first one is the next MOMS take is at 08 plus 24. Be approximately 108 seconds long. Secondly, during the presleep activities in the orbit OPS, 3-2, we would like to not perform step 3. We want to leave the left OMS interconnect as is through the night. In fact, it will stay that way until after the MC2 burn on the rendezvous sequence. And thirdly, on CAP page 4-8 at an MET of approximately 09 10 we would like to delete the maneuver -ZLV tail forward. We want to stay nose forward this evening.

SPACECRAFT Okay. Jerry, you cut out right in the middle of that I think but there are 3 things. Next MOMS pass is 08 plus 24, 108 seconds run. The last thing was delete the -ZLV and do the standard +ZLV at - -

END OF TAPE
CAPCOM We want to stay nose forward this evening.

SPACERCAFT Okay, Jerry, you cut out right in the middle of that I think. But there are three things, next MOM's pass is 08+24 108 seconds run. The last thing was delete the -ZLV and do the standard + ZLV at 09 10.

CAPCOM Okay, Vance, the first one was correct on the MOM, the second one that you read back concerning the maneuver at 9 10 this evening, MET is partially correct. We do not want to perform that maneuver. We just want to do the roll, IMU align and stay with the -ZLV nose forward. And the third thing that you did not receive is, we do not want to perform the interconnect return in the presleep activity 3-2 of the Orbit Ops book. We would like to stay left OMS interconnected. In fact, we'll stay that way until MC2 during the rendezvous maneuvers.

SPACERCAFT Okay, keep the present interconnect aft into the rendezvous through MC2.

CAPCOM Roger that, and the maneuver you can delete that on 4-8 of the CAP.

SPACERCAFT Right.

SPACERCAFT Okay, Bruce, I'm on 2597, how do you hear? Sure..1 2 3 4 5 5 4 3 2 1 - 1 2 3 4 5 5 4 3 2 1. Roger. Okay Bruce, how do you read on the 2968? Okay, read you fine. Yeah, next. Okay, Bruce, you're cutting out and you're weak. Okay, I hear you better now.

CAPCOM Challenger, Houston, going LOS at Hawaii. Approximately 2 minutes back on TDRS.

SPACERCAFT Roger, Houston, we're checking out the Comm on the backup suit.

CAPCOM Roger, Vance, and we're copying you.

SPACERCAFT Okay. Loud and clear, Bruce. Better. Right.

CAPCOM Challenger, Houston, back with you through TDRS, and if someone is available, we have a switch hit on A7 please.

SPACERCAFT Go ahead, Jerry.

CAPCOM Okay, on A7, MADS strain gage to on, please. The system is cooling down.

SPACERCAFT Okay, Jerry, we've got mad strain gage to on.
CAPCOM  Thank you.

CAPCOM  Challenger, Houston, for Bruce, we think you're done with the EMU3, we would like a status if it's available.

SPACECRAFT  EV 1, how do you hear?

SPACECRAFT  Okay, Bruce, how do you hear? Okay, I'm on 2968, read you very weak. Okay, how about now? Switch. How do you hear, Bruce?

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Challenger.

SPACECRAFT  Jerry, I ran the cabin debris - test and debris checkout during the day today, and I thought I would give you just a quick run down on what we saw.

CAPCOM  Okay, we're ready to copy that.

SPACECRAFT  Okay, so far within the cabin, we're not seeing a whole lot of debris showing up anywhere, and we checked all the little corners and all the little hidden places where it might be able to pool and like I said so far we just aren't seeing any. In the way of the filter --

END OF TAPE
SPACECRAFT  Okay. So far within the cabin we're not seeing a whole lot of debris showing up anyway. And we checked all the little corners and all the little hidden places where it might be able to pool and like I said, so far we just aren't seeing any. In the way of the filters, I got all of them except for DDUs 1 and 2 and I'll plan on making sure I catch those tomorrow. But on the other filters, the only ones that had any debris on them to speak of were the IMU fans and they had plenty. They had a lot of stuff on them already and the cabin fans, of course, had some blue lint on the one that I could see and they had a number of particles hopping around in that compartment down there and then off to the 2 sides. I vacuumed those 2 but I couldn't see the other 2 screens. That's in the cabin filter. And that's pretty much what we saw and we'll keep you updated on what we find as we go each day.

CAPCOM  Okay Hoot. Thank you very much. We read all that.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Bruce.

SPACECRAFT  Okay. We have completed the EMU 3 checkout. No major anomalies. However, the communications in the A VOX and B VOX mode have a lot of static coming through the EVA crewman's. You seem to be able to read the Orbiter okay and the Orbiter seems to be able to read you but there is very definitely enough static so that it would be undesirable but I imagine we could survive if we had to for an EVA on it. We have removed the LiOH cartridge that we had to install for the checkout from EMU #3. We have replaced the caps on the LiOH cartridge and gray tapped them back on and put it back in the locker figuring it was out of helmet for EMU #3. It would have served CO2 out of the air if we didn't do something like that. Over.

CAPCOM  Roger. Copy all that, Bruce.

SPACECRAFT  We currently have EMU #3 battery on charge. Charge current is 1.5 amps. It was indicating 16.8 volts under load with the fan running, over.

CAPCOM  Copy that and did you get a pressure off that suit also?

SPACECRAFT  Yes we did. You got another volt. It's reading 14.6 for the airlock pressure.

CAPCOM  Copy that. I told the guys down here that they'd get that.

SPACECRAFT  You can sort of take your pick and just for information, in order to get the EVA accessory items out of the
floor locker middeck 23 Romeo the forward in Orbiter coordinates - that is +X latch - would not retrack manually so we had to beat on the edge, that is the corner of the door with a hammer, that is tapping it down and were then able to pull the latch with finger pressure. We may have some difficulty getting the compartment closed again though but I'm sure we can manage it for entry.

CAPCOM Okay. Copy all that, Bruce, and we see a possible misconfiguration of the UHF. You may want to check that when you get a chance.

SPACECRAFT Well, Vance has been configuring back and forth so if you're looking at it right now it probably is misconfigured.

CAPCOM Okay. That's one thing you need to (garble).

SPACECRAFT Okay. We got it into simplex. I delayed too long in off.

CAPCOM Okay, Vance. We copy that. Thank you.

SPACECRAFT Additionally, Jerry, we took the spare comm carrier which was originally hooked up to EMU #3 off. We substituted the EMU #1 comm carrier, that is mine. We repeated the UHF voice checks a second time in all modes and we got the same results on noise so we feel pretty certain that is not the comm carrier but is the electronics in the spare EMU. Over.

CAPCOM Copy that, Bruce. You were reading my mind. And can you tell me was the third EMU in the airlock when you were doing all this?

SPACECRAFT Correct. The third EMU was in the airlock when we were doing it. It was mounted on its AAP which was properly installed on the floor so that gives you an idea what the configuration was. It looks like it's pointed away from the antenna in the airlock. On the other hand, the other 2 EMUs are sort of pointed away from the antenna also.

CAPCOM Okay, copy all that. Thanks for the words on the configuration.

SPACECRAFT Okay, and we have not loaded the airlock up yet with the small items like the thruster cue extenders and the power tool battery and things like that. We figured that if we started doing that now they'd probably get loose and drift around the next couple of days.

CAPCOM We copy that. That's your call.

END OF TAPE
CAPCOM Go ahead, Houston.

SPACECRAFT Yes, Jerry, for VI2 OPS we did - 02.

CAPCOM Okay, Hoot. We're handing over from Ku to S. You dropped out there. Say again.

SPACECRAFT And Jerry, to comment further on that that was a volcanic site, site Echo 2.

CAPCOM Okay. We're back with you now. Copy you got Echo 2 volcanic site.

CAPCOM And Challenger, if you passed us anything else we've lost it. We're passing from Ku to S-band.

SPACECRAFT Okay. No, that was it, Jerry.

CAPCOM Challenger, Houston. Couple of notes for Bruce and also for Vance or Hoot. You'll have to get your roll IMU alignment started within 5 minutes of sunset for it to work properly.

SPACECRAFT Okay, Jerry. I believe they were listening and I'm ready to copy.

CAPCOM Okay, Bruce. Just wanted to confirm for you that the cracked lens on Bob's EMU lights is no constraint for EVA usage and secondly, the guys are still scratching their hair on the ground down here concerning the 10th of an amp reading you saw on main B power supply when you were checking out your suit. We don't understand it yet. It's still under investigation but it is no constraint for use.

SPACECRAFT Okay. Thank you very much and now let me confirm that I was watching the meter and when the bus select switch was off the meter read 0 and when it was put to main A or main B why we got that 10th of an amp current indication. So it wasn't just the way the meter was positioned.

CAPCOM Okay, understand it was both main A and B that you saw, Bruce.

SPACECRAFT That's correct but only was it observed on EMU #1. We didn't specifically look for it nor specifically notice it on EMU #2.

CAPCOM Okay, copy that. EVA's telling me they saw it on both suits.
CAPCOM: Challenger, Houston. We're a little over 5 minutes till LOS. Next is Guam at 09 plus 10.

SPACECRAFT: Okay, Jerry. We'll see you there.

SPACECRAFT: Houston, Challenger. Are you still with us?

CAPCOM: That's affirm, Challenger, we're still here.

SPACECRAFT: Okay, Jerry, did you see our IMU angles on that?

CAPCOM: That's a negative, Hoot. We got low data rate.

SPACECRAFT: Okay.

CAPCOM: Challenger, Houston. We're going to try to go to high data rate here. We've got about 3 minutes till LOS. We'll see if we can get the information that way.

PAO: This is Mission Control, Houston. 5 seconds away from acquisition through Guam on orbit 23.

CAPCOM: Challenger, Houston with you through Guam for 4 minutes.

SPACECRAFT: Roger, Houston.

END OF TAPE
PAO       This is Mission Control Houston, 5 seconds away from acquisition through Guam, on orbit 23.

CAPCOM    Challenger Houston, with you through Guam for 4 minutes.

SPACECRAFT Roger, Houston, go ahead.

CAPCOM    Okay, Vance, if you don't have anything for me, I have a message to read to you, it would probably be nice if everybody's up and listening.

SPACECRAFT Okay, stand by 1, let's see if they are. Okay, go ahead.

CAPCOM    Okay, Vance, the message is as follows: A final decision on deploying the Palapa tomorrow will not be made until after you go to sleep tonight. If a deploy is scheduled it will probably be scheduled for a 30 (garble) D deploy, 35 A, kick motor burn, it's required that you stay up for one or two REV's late tomorrow, in order to deploy the IRT and start the nominal rendezvous. If a decision is made to delay the Palapa another day, we think that we must schedule the IRT deploy tomorrow, followed by the primary flight rendezvous profile, over. I'm sorry, Vance, that's priority flight rendezvous profile, over.

SPACECRAFT Okay, we understand. No (garble) for staying up, if we stay up, take the option tomorrow where we stay up a little later.

CAPCOM    Roger, understand.

CAPCOM    Challenger, Houston, Vance or Hoot, we never did get the IMU alignment data, we would like to get that from you.

SPACECRAFT Okay, Hoot will run upstairs and get it for you.

CAPCOM    Okay, thank you. And we're about a minute 40 LOS.

SPACECRAFT Okay, Jerry, I got the data when your ready.

CAPCOM    Go ahead.

SPACECRAFT Okay, the two stars were 3156, angle error 0.02, and the angles, I'll read across all the X's first. -0.04, -0.03, +0.04. Reading across all the delta Y's: +0.02, -0.11, +0.12. The Z's: +0.15, -0.19, +0.06. Execution time was 1 and a flash, 09:06:15.

CAPCOM    Okay, copy, all that, Hoot, thank you. We're 30 seconds LOS Guam, Hawaii's next in 8 minutes.
Okay, Jerry, we'll see you in Hawaii, and MAUS 1 and MAUS 2 are activated.

Roger, copy Ron, MAUS 1 and MAUS 2.

Challenger, Houston, with you at Hawaii for 4 minutes.

You're loud and clear.

Roger, and we've got a couple of questions for Ron, first of all we would like activation time for MAUS 1 and 2, and also we're standing by for an ASE temp check.

Okay, Jerry, that's just what I was going to ask if you wanted this time.

That's affirm, Bob, we're ready for it.

Okay, Jerry, the activation time for the MAUS 1 is MET 1/9: (garble) second, that activation time for the MAUS 1 is 9, 19. 9 hours, 19 minutes. MAUS 2, 9, 22; 9, 22.

Okay, we copy 9, 22 for 2, and say again the minutes for 1, Ron.

That's 9, 19; 9 19 for 1.

Okay copy that, and we would also like a PRM activation from Bob or whoever did that when you get a chance.

While we're waiting for that, Jerry, we didn't get any deactivation info for the MAUS. The MAUS 2 has a run time 3 hours 10 minutes, how should we handle that.

END OF TAPE
CAPCOM: While we're waiting for that, Jerry, we didn't get any deactivation info for this MAUS, the MAUS 2 has a run time 3 hours 10 minutes, how should we handle that?

CAPCOM: Roger, Ron, stand by, we'll get you an answer. I think we intend to keep it going all night.

SPACECRAFT: Okay.

CAPCOM: Challenger, Houston, for Ron. The intent now, Ron, is to let MOM's run overnight, we'll deactivate in the morning.

SPACECRAFT: Okay, we'll do that, thank you.

SPACECRAFT: Say, Jerry, ready for the PRM activation time?

CAPCOM: Ready to copy.

SPACECRAFT: 1/07:32:30.

CAPCOM: Roger, we copied that.

SPACECRAFT: (Garble)

CAPCOM: Roger we're standing by.

SPACECRAFT: You should have them, (garble) to get them.

CAPCOM: Roger, Bob, the guys in the backroom are looking at it, we'll give you a shout here in a second.

SPACECRAFT: Okay.

CAPCOM: And Challenger, Houston, for Bob, we've seen enough of the SE temp checks.

SPACECRAFT: Okay, I'm going to shut it down.

CAPCOM: Challenger Houston, we're 30 seconds to LOS Hawaii, TDRS in 7 minutes. When we get on TDRS we'd like to have a status as far as how you got into the shopping list today, how many of those you accomplished.

SPACECRAFT: Okay, Jerry, we'll give it to you.

CAPCOM: Challenger, Houston, with you on TDRS.

SPACECRAFT: Okay, Houston, we read you loud and clear.

CAPCOM: You're loud and clear too, Ron.

SPACECRAFT: Okay, Houston, Challenger.
CAPCOM: Challenger, Houston, go ahead, Vance.

SPACECRAFT: Okay, running through some of the shopping list items, the first one which was a crew module measurements, one measurements and tape measurements, that is, alignment marks, we did not accomplish at all because we had too much other stuff going on in the area where the measurements were to take place. Turns out that Ron did not get exercised, however, Bob and Bruce did on the treadmill. Also CAPR picked up exercise. But will have to get it later. On the 360 setup, I'll let Ron explain to you what we did on that.

SPACECRAFT: Okay, Jerry, because of the lighting problem we did not do the cinema 360 treadmill scene during the TV (garble) earlier. We did get a cinema 360 scene of middeck - during the middeck meal service, eating in the 1g environment, however, we will pick up that treadmill scene, on the next cinema 360 session. How do you read that? There's a loud noise on this end.

CAPCOM: Roger, Ron, you've got a little bit of static in the background, we were hearing Vance okay though.

SPACECRAFT: Did you read me at all?

CAPCOM: Roger, Ron, I can read you loud and with a little bit of static.

SPACECRAFT: Okay, in summation. We did get a cinema 360 scene it was not the treadmill scene, but was one which I think cinema 360 folks will like very much.

CAPCOM: Roger, we copy that, Ron.

CAPCOM: And Challenger, Houston. Ron, we wanted to know if you had that 360 set up for the Palapa deploy if we get it tomorrow.

SPACECRAFT: Negative, we are not set up for that yet. However, we will be changing magazines when the time comes for it, over.

CAPCOM: Roger, understand Ron, thanks.

SPACECRAFT: I plan to finish out this magazine on the treadmill scene before we change it.

CAPCOM: Roger, understand, thanks.

SPACECRAFT: And Jerry, advise that the MMU3 was checked out, of course you are aware of that, and the --

END OF TAPE
STG-41-B AIR/GROUND TRANSCRIPT 03/21 01:22:45 2/4/84 PAGE 1

SPACERAPP: I'll try to finish out this magazine on the treadmill scene before we change it.

CAPCOM: Roger, understand. Thanks.

SPACERAPP: And Jerry, advise that the MU 3 was checked out. Of course, you're aware of that and the debris work that came up on the teleprinter this morning was performed by the PLT.

CAPCOM: Roger, copy Vance. Thanks.

SPACERAPP: And sorry, Guy. We've been talking with Jerry and I think that was you at first.

CAPCOM: That's okay Vance. Jerry's sister says we sound alike too.

CAPCOM: And Challenger, Houston. We've got a state vector coming up to you and we saw the 10 errors on CRT 2, we wanted to check if that's just where you are powering it down.

SPACERAPP: That's all we did was power it down. We still have CRT 1 on.

CAPCOM: And Roger Vance and the vector is good till tomorrow morning and we don't have anything else for you tonight so we'll wish you goodnight and hopefully talk to you, won't have to talk to you again till the morning.

SPACERAPP: Okay, well fine and we'll be ready for whatever the teleprinter tells us to.

CAPCOM: And Challenger, Houston. We're back with you. We dropped out of TDGS there for a second and just to let you know that state vector is good till orbit 30.

SPACERAPP: Okay, state vector's good till orbit 30.

CAPCOM: Roger, Vance. You all have a good night's sleep.

SPACERAPP: Okay.

PAO: This is Mission Control, Houston. Day 1, 10 hours, 3 minutes. Challenger crew has been tucked in for the night. Midway through orbit 23. Change-of-shift press conference at 5:30 Central in the JSC briefing room. We'll have not one but two flight directors, Harold Draughon and Gary Coen. Draughon has been sort of offline doing some flight planning with sort of a tiger team operation on how to regroup after the Westar deployment and what to do about PALAPA. And Gary Coen has been minding the Spaceship during the day. Again, that
is at 5:30 pm Central, room 135, JSC Newsroom. This is Mission Control, Houston.

END OF TAPE
SPACECRAFT  Houston, this is Challenger.

CAPCOM  Challenger, Houston, go ahead.

SPACECRAFT  Okay, just a voice check with the speaker mike, I'm going to go downstairs and do one on that speaker mike.

CAPCOM  Roger, sounds good.

SPACECRAFT  Houston, this is Challenger on the middeck speaker mike, how do you copy?

CAPCOM  Challenger, Houston, you're loud and clear.

SPACECRAFT  Houston, this is Challenger with the middeck speaker mike, how do you copy?

CAPCOM  Challenger, Houston, you're, read you loud and clear.

SPACECRAFT  Houston, this is Challenger on the middeck speaker, how copy?

CAPCOM  Challenger, Houston, I'm reading you loud and clear all three times. And Challenger Houston, on UHF, I was reading you loud and clear on air-to-ground 1 awhile ago.

PAO  This is Mission Control, Houston at mission elapsed time 1 day, 11 hours, 26 minutes. All continues to be quiet aboard the Orbiter Challenger as it passes over the Pacific Ocean on rev 24. At the end of this orbit at the equator, the Challenger will have traveled 544,527.28 nautical miles, more or less. We are processing TDRS telemetry right now. Although, the crew itself, the crewmen are in their sleep shift. We have a temperature onboard of 86.4 degrees, a relative humidity of 28% and the cabin pressure is 14.66 psi. The Orbiter itself at this point weighs in at 226,457 lbs. As we say, all continues to be quiet aboard the Orbiter and in this control center. At mission elapsed time, 1 day, 11 hours, 27 minutes, this is Mission Control, Houston.

END OF TAPE
PAO    This is Mission Control, Houston at mission elapsed
time, 1 day, 13 hours. The Orbiter, Columbia is now on the tail
end of orbit 25 approaching the west coast of South America and
the Mission Control Center still all quiet. The planning shift
is basically taking a look at various options for what to do
tomorrow and awaiting word from the Indonesians and folks at
PALAPA who would let us know what their plans are for deployment
of that satellite if they do decide to do that. As far as we
know, the meeting that would make that decision has not yet begun
and we're still awaiting any developments. At 1 day, 13 hours,
this is Mission Control, Houston.

END OF TAPE
PAO  This is Mission Control, Houston at 1 day, 13 hours. Orbiter Columbia, I'm sorry, Orbiter Challenger is over north Africa now. Here in the Mission Control Center there are some facilities folks in the Mission Control room, investigating the report of some faint chemical smells, some odors that seem to be coming out of an air handler and there is no effect at this point, nor do we expect there to be on the conduct of the mission or the operations here in the Control Center. It's just a routine check of a report. This is Mission Control, Houston.

PAO  This is Mission Control, Houston at 1 day, 14 hours, the Orbiter Challenger is approaching AOS TDRS east. We're in a LOS period right now, we expect to start taking data here in just a few minutes, about 52 seconds as a matter of fact. The Planning Team is still awaiting word from a meeting of officials representing Hughes, maker of spacecraft for PALAPA, and the folks from PALAPA to see what their decision is as to when we might deploy that satellite. And awaiting the ability to go ahead and start making CAP updates and changes for tomorrow's flight plan. Also here in the Mission Control Center, we're still trying to determine what the source of is of a faint odor. It seems to be coming through the Air Handling System. Folks from Center Services are conducting air sniffing procedures to see if they can't figure out what it is and other than that, all is quiet here at Mission Control at 1 day, 14 hours, 33 minutes, this is Mission Control, Houston.

PAO  This is Mission Control, Houston. Based on the desires of Pernutel, the organization which controls PALAPA, the Indonesian communication satellite, the flight controllers here in Mission Control are planning to go for an orbit 50 deploy of PALAPA on Monday. Planners are now working on a schedule which cause for priority IRT rendezvous Sunday. And an orbit 50 PALAPA deploy Monday. The PKM burn would occur on rev 51A, Monday. The first EVA would occur on Tuesday under this plan. Again, Pernutel has chosen to go for a Monday deploy of PALAPA and the flight controllers here in Mission Control on the Planning Team are working to see if they can plug those into the CAP and make that happen. At 1 day, 15 hours, 5 minutes, this is Mission Control, Houston.

END OF TAPE
PAO  ...hours 5 minutes. This is Mission Control
Houston.

PAO  This is Mission Control, Houston, now 1 day, 16
hours and 13 minutes into the flight of Shuttle mission 41-B.
Orbiter Challenger is on the end of rev 27, has crossed over into
TDRS coverage and we are processing some TDRS data. When the
Orbiter passes over the equator and begins rev 28 we will have
traveled 612,000 nautical miles on this journey so far. Flight
planners now are putting together a schedule for the IRT
rendezvous tomorrow. That will take up a good part of the flight
day and we are planning to deploy the PALAPA B-2 satellite on
Monday on rev 50 with a PKM burn on rev 51, and again that would
necessitate EVA starting then on Tuesday under that present
plan. Here in the Mission Control Center, the search does go on
for that elusive odor we talked about somewhat earlier. It's a
faint chemical odor that seems to come through the air handlers
and as yet there's no real understanding of what that is but
there isn't any danger to the people in the control center or
any danger of course to the function of the center itself or to
the crew in the spacecraft. It just seems to be some sort of a
strange problem that's cropped up in the building in the bowels
of the building someplace and that mystery does keep us
occupied. At Mission Elapsed Time 1 day 16 hours 14 minutes,
this is Mission Control Houston.

PAO  This is Mission Control Houston, over 600,000
nautical miles into the flight of shuttle mission 41-B. The
Orbiter Challenger now passing over North Africa on orbit 28 of
the Earth. We are anticipating that there's not going to be a
great deal of press interest in having a change-of-shift briefing
at 1:30 with off-going Flight Director Larry Bourgeois and to
that end we're offering the opportunity now, for the next hour or
so, for any news media organizations who would like for us to go
ahead and hold that briefing to please let us know. If we don't
hear a whole lot, we do have the intention of cancelling that
briefing and should you have any objections to that please call
the JSC newsroom or the KSC newsroom. At Mission Elapsed Time 1
day 16 hours 51 minutes, this is Mission Control Houston.

PAO  This is Mission Control Houston, all still quiet
here during the planning shift on the 28th orbit.

END OF TAPE
This is Mission Control Houston, all still quiet here during the planning shift on the 28th orbit. Again, we are planning to cancel the scheduled 1:30 a.m. change-of-shift press conference with Larry Bourgeois and invite your comments. If you don't agree with that decision, please let us know in the next half hour or so at the JSC newsroom or the KSC newsroom. At Mission Elapsed Time 1 day, 17 hours 14 minutes, this is Mission Control Houston.

This is Mission Control Houston, we do plan to go ahead and cancel that scheduled 1:30 a.m. change-of-shift briefing. Again that briefing has been canceled. At 1 day 17 hours 34 minutes, this is Mission Control Houston.

This is Mission Control Houston, at 1 day, 18 hours Mission Elapsed Time. The crew has about 30 minutes remaining in its sleep period. Orbiter is on rev 29, just over the south Pacific Ocean. As a reminder, the change-of-shift briefing with the Flight Director Larry Bourgeois is canceled. This is Mission Control Houston.

This is Mission Control Houston, at 1 day, 18 hours, 24 minutes Mission Elapsed Time. Just a little more than 5 minutes remaining in the sleep period but we're now seeing activity on the CRTs and the Orbiter flight deck indicating that probably the alarms went off, or there are some crewmembers awake making some heat strokes. Handover has occurred in the Mission Control Center, Flight Director Randy Stone and his crew now in charge of flight control. CAPCOM will be John Blaha, We'll stand by for wake-up music, probably in about 5 minutes, at Mission Elapsed Time, 1 day 18 hours, 24 minutes. This is Mission Control Houston.

This is Mission Control Houston. It's 1 day, 18 hours, 51 minutes Mission Elapsed Time. We're less than a minute away from AOS through Yarragadee, crew should be awake by now and we'll stand by for the probability of a wake-up call from CAPCOM John Blaha. This is Mission Control Houston.

(wake-up music)

Good morning, Challenger, we're with you through Yarragadee for 6 minutes and as you can see, we've improved this morning.

Yes, much better John, Brian says that's "Take the A Train".

You bet.

Yes, that's an improvement this morning, John.
CAPCOM          We thought you would enjoy that one.

SPACECRAFT      By the way John, I missed yesterday morning's wake
                up call, what was it?

CAPCOM          A confusion.

SPACECRAFT      That the idea I got.

CAPCOM          You got it right.

END OF TAPE
CAPCOM: And Challenger, Houston, I know you've only been up for a short while but if somebody has a second I would like to just point out something to you that we need to make sure we get done at 19:00 this morning.

SPACECRAFT: Yes, go ahead, John.

CAPCOM: Okay, way over on the back of that CAP, under CAP notes, it refers to a water dump at 19:00 and we've got to make sure we start that at 19:00 and then we need to terminate it at 19:40, regardless of the quantity of the water and this is so that it won't affect a MOMS data take which is scheduled around 20 plus 01.

SPACECRAFT: Okay John, you broke up during part of that. I understand there's a MOMS data take at 19:21?

CAPCOM: Negative, the MOMS data take is at 20 plus 01. Because of that, we need you to get started with the water dump this morning at 19 plus 00. That's in about 4 1/2 minutes and then we need you to terminate that water dump at 19 plus 40 and over on the second page of message no. 16 bravo, it refers to that water dump, dump supply water tank bravo to 103.

SPACECRAFT: Okay, copy. Gee, aren't we going to have to terminate that water dump for the IMU align?

CAPCOM: Negative, we have talked that through and that's okay.

SPACECRAFT: Okay, I understand. It's alright to leave the water dump going for the IMU roll star track align.

CAPCOM: That's affirmative, just make sure you start it at 19 and stop it at 19 plus 40 regardless of the quantity of the water.

SPACECRAFT: Okay, will do. Okay John, we got the MAUS II deactivated at MET 18:54.

CAPCOM: Roger, thank you. Challenger, Houston, we're going LOS here at Orrocal. We will see you TDRS at 19 plus 22.

SPACECRAFT: Roger John.

PAO: This is Mission Control, Houston. We're out of range of the Orrocal Station now. Wake-up music was of course, A-train, as performed by the local group Contraband which
Features as it's tenor sax player, Dr. Ron McNair, also known as MSL in this mission. The crew was instructed and Challenger Pilot, Hoot Gibson acknowledged that requirement for a water dump to begin at mission elapsed time of 1 day, 19 hours. It's imperative to get that water dump out of the way before we do a data take with the MOMS, the Modular Optoelectronic Multi-spectral Scanner. And that data take is going to begin at the termination of that water dump. The water dump would interfere with that data so the timing on those events is critical to the quality of the data they'd acquire. We'll acquire signal again through the TDRS system in about 14 1/2 minutes. At mission elapsed time 1 day, 19 hours, 7 minutes, this is Mission Control, Houston.

PAC: This is Mission Control, we have acquisition through TDRS at 1 day, 19 hours, 22 minutes and we'll have voice contact momentarily.

CAPCOM: Challenger, Houston is with you through TDRS.

CAPCOM: Challenger, Houston's with you through TDRS.

SPACECRAFT: Okay John, we're hearing you fine.

CAPCOM: Okay and if somebody has ...
CAPCOM Challenger, Houston's with you through TDGS.

SPACECRAFT Okay, John. We're hearing you fine.

CAPCOM Okay, and if somebody has a second, I just have a change to the heater reconfig brave that you have to do at 20 plus 00 when someone's ready to copy.

SPACECRAFT Okay. Ready to copy, John.

CAPCOM Okay. Where you do the heater reconfig, page 6-6, the orbit pocket, there in the orbit checklist, line 4, APU heater gas generator fuel pump we'll be taking number 1 and 3 to A AUTO.

SPACECRAFT Okay. We copy that, John. The APU heater gas generator fuel pump 1 and 3 will go to A AUTO instead of the B AUTO.

CAPCOM Roger that. Good read back, Boot.

SPACECRAFT Okay, John, the SMUS-1 is deactivated at 19:29, 19:29 MET.

CAPCOM Roger. Thank you very much, Ron.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston. You called.

SPACECRAFT Roger, John. I have the IMU align data for you if you'd like.

CAPCOM We have had high data rate and we have all the data. Thank you very much, Vance.

SPACECRAFT Roger.

SPACECRAFT Houston, Challenger.

CAPCOM Roger. Go ahead.

SPACECRAFT John, just completed the ECLSS redundant component checkout. Did you observe?

CAPCOM Roger. We did.

SPACECRAFT Okay. The main thing I noted was the IMU fan delta P's were slightly less than called out. Not much less. Cabin fan delta P was too, and that was about it.
CAPCOM: Roger. Understand, Vance, and we'll continue to look at the data for you.

SPACECRAFT: Okay. And now, I'm continuing with the freon pumps.

CAPCOM: Roger. Understand, and we're watching it with you, Vance. Thanks.

PAO: This is Mission Control, Houston. Challenger Commander, Vance Brand, going through the ECLSS redundant configuration checkout. The functions are relayed from the environmental control life support system caution and warning alarms, and elements of that system onboard the spacecraft and is a part of the early morning operations onboard the Challenger this morning. It's a pretty quiet pass through the TDRS system. Here, obviously, crew involved in their presleep activities, breakfast, and preparing for the day's activities. The first significant activities that'll be occurring today will be a couple of OMS burns to circularize the orbit at about a 150 n. mi. The first OMS burn will occur at 1 day, 21 hr, a little over an hour from now, and the second burn at 1 day, 21, 40. And we'll have more data on the TIG's duration and delta V's as those are computed and made available to us and to the crew. We still have another 20 min of acquisition through the TDLS system here at Mission Elapsed Time, 1 day, 19 hr, 54 min. This is Mission Control, Houston.

CAPCOM: Challenger, Houston. We're going LOS TDLS here in a minute, 45. If I could get somebody who's back by panel A7L, they could take the MADS strain gage to PCM enable. We will see you at Yarragadee at 20 plus 2 - -

END OF TAPE
CAPCOM ... here in a minute, 45. If I could get somebody who's back by panel A7L, they could take the MADS strain gage to PCM enable. We will see you at Yarragadee at 20 plus 27.

SPACECRAFT Okay John, we'll see you there and we've got the strain gage switch flipped.

CAPCOM Thanks a lot.

PAO This is Mission Control, Houston, on orbit 30 at 1 day, 20 hours, 17 minutes. Just now have gone beyond the range of the TDRS satellite. We're LOS and we'll acquire in 10 minutes through Yarragadee, a voice only contact during the Yarragadee pass. Very quiet onboard the vehicle this morning, of course the postsleep activity gives them the opportunity, gives the crew the opportunity to have some time for personal hygiene and breakfast and prepare for the day's activities by configuring cabin lighting and stowing window shades and gaining access to the documents, principally the rendezvous checklist and activity plans, that will be necessary to have at hand during the day's events. We'll stand by for contact again in just under 10 minutes through Yarragadee. At mission elapsed time, 1 day, 20 hours, 18 minutes, this is Mission Control, Houston.

PAO This is Mission Control, Houston, we're just a few seconds away from capability for our voice only contact through the UHF station at Yarragadee, Australia at mission elapsed time, 1 day, 20 hours, 27 minutes.

CAPCOM Challenger, Houston's with you at Yarragadee for 8 minutes.

SPACECRAFT Okay John, read you loud and clear.

CAPCOM Challenger, Houston, if you have a second, I have a couple of things for you.

SPACECRAFT Okay John, go ahead, we're ready.

CAPCOM Okay, first of all, on the OMS burn coming up, if you could turn to page 9-4 in your orbit pocket please and tell me when you're there.

SPACECRAFT Okay, I think you meant 9-4 in the orbit ops which is where we are now.

CAPCOM Roger, that's what I meant. Okay, what I need to just tell you there is that your prop configuration, the way it is with the left OMS crossfeed bravo to open and alpha to close is good. You can delete the areas there that talk about if feeding interconnect and otherwise drain the postburn reconfig and just maintain your crossfeed valve configuration.
SPACECRAFT  Okay John, we copy that. After that OMS burn, we will disregard the section where it says, if feeding interconnect and the otherwise, and you like the configuration we're in feeding under the B-crossfeed on the left OMS.

CAPCOM        Roger that. And if you're still there, I have your burn PAD when you're ready to copy.

SPACECRAFT  Okay, it's ready to copy.

CAPCOM        Okay, the recirc #1 burn will be left OMS, TV roll, all balls, trim minus 0, .1 plus 5.2, NA, weight 225853, TIG 001/21:23:22.8. peg 4, NA. Peg 7, -0026.8, all balls, minus 000.5. Burn at 030169360 delta V tot 0026.900:31, Vgo acqs plus 0025. ...

END OF TAPE
CAPCOM    Delta V tot 0026.9, 00:31. V GO AX plus 0025.29 plus 005.43 plus 007.21. HA 171 by plus 150. The left OMS helium press VAP ICE, A OPEN, bravo CLOSE. Read back.

SPACECRAFT  Okay, John. We copied. The left OMS at 000 minus 0.1 plus 5.2, NA 225853001/21:23:22.8 minus 0026.8 all balls minus 000.5, attitude 030169360. Delta V tot 0026.9 00:31 plus 0025.29 plus 005.43 plus 007.21, 171 by 150. Left OMS A OPEN, B CLOSE.

CAPCOM    Roger. That's a good readback, and I have your PAD for your recirc number 2 burn when you're ready to copy.

SPACECRAFT  Okay. Ready to copy recirc 2.

CAPCOM    OMS left, TV roll all balls. Sum load minus 0.1 plus 5.2, NA 225252. TIG 001/22:08:32.6. TIG-4 NA. PEG-7 minus 0036.3 all balls plus 000.9. Burn at 335336341. Delta V tot 0036.3, 00:42 plus 0034.21 plus 007.34 plus 009.75. That'll be an HA of 150 by plus 150. Left OMS helium alpha to CLOSE, bravo TO OPEN. Read back.

SPACECRAFT  Okay, John. You dropped out during burn attitude, if you could give us that again.

CAPCOM    Roger. 335336341.

SPACECRAFT  Okay. Reading back. Left OMS all balls, TV roll minus 0.1 plus 5.2, NA 225252, 001/22:08:32.6 minus 0036.3 all balls plus 000.9. Burn attitude 335336341. Delta V tot 0036.3, 00:42 plus 0034.21 plus 007.34 plus 009.75, 150 by 150. Alpha CLOSE, bravo OPEN.

CAPCOM    Roger. Good readback, Hoot, and the postburn reconfig will be what we talked about for both burns.

SPACECRAFT  Okay. We've got it. Thanks, John.

CAPCOM    Roger that.

SPACECRAFT  And, John, you got your PAM heater check on that pass. Did you get good data?

CAPCOM    Standby. I'll see if payloads wants that. Roger, and what we would like -- we understand you went ahead and terminated that and that's fine. We'll look at the data on the playback.

SPACECRAFT  Okay, John. That particular test just called for 1 min of PAM. I already got about 3 and I just didn't want to heat up the ASE any.
CAPCOM: Roger. We understand, Bob. Very good.

CAPCOM: And Challenger, Houston. Don't mean to bother you again, but if somebody has a second, we're interested in how long

END OF TAPE
And Challenger, Houston. Don't mean to bother you again, but if somebody has a second, we're interested in how long were you able to visually see the Westar after deploy?

Couldn't give you a number on that, John, but it was an awful long time. We got some of it going back against the earth. Gee, John, we don't have a number, like Bob said, but we watched it until we went into the darkness, and that ought to give you probably a good clue of what time that was. We followed it down below us and passing us until we went into the darkness.

Roger. Understand, Vance. Thanks a lot.

John, I'll reiterate, the last time we saw it, it was spinning and just as stable as a rock.

Roger. Understand. Thanks for the good report.

Challenger, Houston. We're sending up targets for the recirc 1 burn and a state vector.

Okay. We copy that.

Challenger, Houston. We're going LOS Orroral in 30 sec. See you TDRS at 20 plus 59. Enjoy your sunset.

How did you know that? That's what we were just doing.

You know, they are a lot of people down here that provide a lot of good information to us.

This is Mission Control, Houston. We're out of the range of Orroral now and we'll reacquire through TDRS in 17-1/2 min. The Orbiter just now approaching the terminator as CAPCOM John Blaha indicated, the ship going from daylight into darkness. The TIG burns, or OMS burns, uplinked their information. I guess most critical to us are the time of ignition and the products of those burns. The ship is presently in an orbit of 165 n. mi. by 171 n. mi. First OMS burn will occur at 1 day, 21 hr, 23 min, 22.8 sec, and will produce an orbit of 171 by 150 n. mi. The second OMS burn occurs 1 day, 22 hr, 8 min, 32.6 sec and will circularize the orbit at 150 n. mi, 150 by 150. Those, obviously, retrograde burns. Mission Elapsed Time presently 1 day, 20 hr, 44 min. This is Mission Control, Houston.

This is Mission Control, Houston. We're a few seconds away from AOS through the TDRS system. Mission Elapsed Time is 1 day, 20 hr, 59 min, and we're about 23 min away from the first retrograde OMS burn. We're now processing data through
TDRS and should have voice contact in just a few moments.

CAPCOM   Challenger, Houston is with you through TDRS.

SPACECRAFT  Go, Houston. Loud and clear through TDRS.

CAPCOM   Roger. You're loud and clear, also.

SPACECRAFT  Houston, Challenger.

CAPCOM   Roger. Go ahead.

SPACECRAFT  John, if you're watching, we'll give you a gimbal check.

CAPCOM   Roger. We're ready for it, Vance.

PAO   This is Mission Control, Houston. Challenger Commander, Vance Brand, now putting the OMS engines through a range of motion gimbal check to assure proper control of those thrust chambers --

END OF TAPE
PAO This is Mission Control, Houston. Challenger Commander Vance Brand now putting the OMS engine through a range of motion gimbal check to assure proper control of those thrust chambers during the OMS burn firing. Mission elapsed time is 1 day, 21 hours, 5 minutes and we're just over 18 minutes away from the OMS burn.

PAO This is Mission Control, Houston. The Guidance Navigation Control Officer has affirmed that Mission Commander Vance Brand has positioned Challenger in the proper burn attitude in preparation for the OMS burn. Ignition time 14 minutes away. Now presently Challenger is effectively flying upside down and backwards since those burns are against the line of flight and into the velocity vector accordingly. The engines are pointed toward the line of flight. The vehicle flying backwards and upside down so that the astronauts can have horizon reference during the burn. Mission elapsed time is 1 day, 21 hours, 9 minutes and we're 13 minutes, 35 seconds away from ignition.

PAO This is Mission Control, Houston, 1 day, 21 hours, 18 minutes mission elapsed time. We are 5 minutes away from ignition on the retrograde OMS burn and all the flight controllers have given Flight Director Randy Stone a go for this burn, the vehicle's in a good attitude, the numbers installed in the GPCs are correct and the propelling configurations are all correct as well. Four and half minutes away from burn, this is Mission Control, Houston.

PAO Mission Control, Houston, we're 3 minutes from the burn.

PAO Shuttle Mission Control, we're a minute, 30 from the OMS burn. This is Mission Control, Houston, at 45 seconds from the OMS burn, mission elapsed time right now 1 day, 22 hours, 22 -- 1 day, 21 hours, 22 minutes. The OMS burn now 30 seconds away, 20 seconds to burn time, 15, 10 seconds, 5, 4, 3, 2, 1, 0. Data show ignition and burn in progress and engines look good. Guidance Navigation and Control Officers say the rates and attitudes look good.

CAPCOM Challenger, Houston, you can ignore the left OMS quantity message. Everything's okay.

SPACECRAFT Okay, thank you. Good burn. Here's your gimbal check, Houston. And beautiful burn, really gives us low residuals.

CAPCOM Roger that. We're ready for the check.

PAO This is Mission Control, Houston, all the data shows we got a real good burn out of that one. That one call
by the CAPCOM instructing the crew to ignore a message and alarm that went off. The Propulsion Systems Officer here in the Control Center called out a bad oxygen gage reading that tripped an alarm on the OMS system. It gave the crew a false alarm, but they had a good burn and we'll be looking for the digitals prior to this burn here since we acquire a little more data from System Tracking. Mission elapsed time is 1 day, 21 hours, 25 minutes, this is Mission Control, Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Would you like to go back to the minus 3LV maneuver?

END OF TAPE
PAO ... tracking. Mission elapsed time is 1 day, 21 hours, 25 minutes, this is Mission Control, Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead.

SPACECRAFT Would you like to go back to the minus 2 LV maneuver now?

CAPCOM Roger. Challenger, Houston. It is not required. The next attitude you could go to if you wanted to would be the next burn attitude.

SPACECRAFT Okay, we'll do that.

CAPCOM And just for your information, PROP has reviewed the data and your left OMS ox quantity gage is down, the fuel gage is okay.

SPACECRAFT Okay, yes that's what we were seeing in here John, everything looked good on system 2 so we just continued with that burn about the time you called it.

CAPCOM Roger that, good show.

SPACECRAFT And Houston, that one is not related to the temperature sensor that we had. Wasn't that on the right OMS that we had a tank sensed temperature that was out.

CAPCOM Roger that, Hoot. Your memory is exactly correct and they're not related.

SPACECRAFT Okay, thanks.

PAO Mission Control, Houston, the data shows that Commander Vance Brand has loaded the next burn targets in and that the data looks good.

SPACECRAFT We're maneuvering.

CAPCOM Roger that, Vance.

PAO That second OMS burn to occur in 34 minutes. Prior to that, the first burn has altered Challenger's orbit with a present apogee of 170.6 nautical miles and a perigee of 150.6 nautical miles, 6/10ths of a mile away from the optimum.

CAPCOM Challenger, Houston, to get you set up for the rendezvous, we're going to be uplinking an IRT state vector and the co-variance matrix.
SPACECRAFT  Okay John, copy.

CAPCOM  Challenger, Houston, I have your SEP burn weight and TIG time on page 3-5 of your rendezvous book when you're ready.

SPACECRAFT  Okay standby just a second, John. Okay, go ahead John.

CAPCOM  Roger, weight 224443, TIG 001/23:10:39.0, read back.

SPACECRAFT  Okay John, we've got weight as 224443, TIG 001/23:10:39.0.

CAPCOM  Roger, good readback. Challenger, Houston, we're going LOS here at TDRS, see you in 10 minutes over Yarragadee. Your attitude targets and configuration look good for the burn.

SPACECRAFT  Okay Houston, we'll see you there, John.

PAO  This is Mission Control, Houston, we are out of contact with the vehicle through the TDRS system. We will reacquire again in just over 9 minutes through Yarragadee. As CAPCOM John Blana indicated, all the inputs to the onboard computer system are appropriate for the next OMS burn which occurs in a little over 14 minutes. That burn will occur over Yarragadee where we have voice but no data so we'll depend on the crew's advisory to inform us of the adequacy of that burn. Challenger on orbit 31 at mission elapsed time, 1 day, 21 hours, 54 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston's with you at Yarragadee for 8 minutes.

END OF TAPE
-- 24 min. This is Mission Control, Houston.

Challenger, Houston's with you at Yarragadee for 8 min.

Challenger, Houston's with you at Yarragadee for 7-1/2 min.

Challenger, Houston's with you at Yarragadee for 3-1/2 min.

Roger, Houston. We're (garble) about the burn, waiting.

Roger.

This is Mission Control, Houston. We're passing between a keyhole and a keyhole through a keyhole between Yarragadee and Orroral, and we'll take a data dump at Orroral here and maybe we'll get a good close look at the OMS's performance during that burn. Mission Elapsed Time is 1 day, 22 hr, 13 min. Computed data, we're taking data through Orroral presently, and computer data suggests the --

Challenger, Houston. We're going LOS Orroral in 20 sec. See you TDRS 22 plus 37.

Roger, Houston.

This is Mission Control, Houston. Computed data shows new orbital parameters as follows: An apogee of 150.5 n. mi., perigee of 150.0 n. mi., and an orbital period of 1 hr, 30 min, 12 sec. Those numbers may change as we continue to orbit and get more precise data, but the initial look reports those figures, which, of course, are extremely close to the optimum 150 mile circular orbit. Mission Elapsed Time is 1 day, 22 hr, 17 min, and we'll acquire through TDRS in 19 min. This is Mission Control, Houston.

This is Mission Control, Houston at 1 day, 22 hr, 35 min Mission Elapsed Time. Getting ready for a rendezvous in parts of the operations using the IRT, the Integrated Rendezvous Target, the 6 ft balloon that will be inflated in the Orbiter's payload bay. On the occasion of deployment, inflation and deployment of that balloon, there'll be a separation burn performed by the Orbiter at approximately 3 ft per sec to put some distance between the ship and the target and enable the crew to perform rendezvous operations which is intended as a forerunner to the solar maximum repair mission, mission 41-C which, of course, is a rendezvous capture and on-orbit repair of that solar maximum mission satellite, scheduled for 1984. This exercise will be a closed loop rendezvous sequence, using this
We'll have voice and data through TDRS in less than a minute. At Mission Elapsed Time, 1 day, 23 hr. 36 min. This is Mission Control, Houston.

CA COM Challenger, Houston's with you through TDRS, and we're uplinking a TWEET IRT state vector --
Challenger, Houston's with you through TDRS and we're uplinking a tweet IRT state vector.

Okay, understand John. And we've completed steps on page 3-5.

Roger, copy. Challenger, Houston, if somebody's back by A7U, I have a switch.

(garble) Houston?

Roger, we need the TV power control to COMMAND and that's so that we can select a camera if we have to over Mila, Goldstone but be advised we will not be moving any cameras.

That's complete.

Thanks a lot.

Houston, Challenger, how do you read John?

Loud and clear, Bruce.

Yes, we have completed block 1 which is the IRT predeploy configuration. I wonder if you concur with my turning on the power switch for just a moment to check and make sure we've got power back in the panel, all the talkbacks indicating inhibits are still okay.

I'll try to get an answer from Payloads for you Bruce.

Okay, thank you.

Challenger, Houston, Bruce, you're go to check the power.

Okay, thank you John.

Mission Control, we're getting a video now from delta camera. Orbiter's in the deployment attitude. IRT is just to the right of the center of the screen here. This is Mission Control, the balloon was just jettisoned from the payload bay.

And the balloon now being shown from the alpha camera, not quite in focus. And those dots on the screen are other debris which came out of that canister with the balloon. This is Mission Control, the sun's right underneath the belly of the Orbiter at this point and doesn't lend itself to optimum television coverage. And it appears there's some difficulty also sorting out the balloon from somewhere, drops of debris which (garble) from that canister at the point of jettison. The balloon should be inflated by now but we're ....
CAPCOM Challenger, Houston, if you could tell us the IRT status. We can't see it on the TV downlink.

SPACECRAFT Okay, John, it deployed and it went out real pretty with a very slight toeing angle. It appears to me that it makes about one rotation every 11 or 12 seconds.

CAPCOM Roger that and what is its current inflation status, Vance?

SPACECRAFT That's what I'm holding off on it, it doesn't, it does not look to me like it's inflated yet.

CAPCOM Roger, understand.

PAO This is Mission Control Payloads officer indicating that the timer -- the timing on the balloon suggests that it should be inflated at this point.

SPACECRAFT John, John (garble).

CAPCOM Roger, say again Vance, we didn't understand.

SPACECRAFT Does not appear that the STABs were fired.

CAPCOM Roger, understand Vance.

END OF TAPE
PAO       The timer -- the timing on the balloon suggests that it should be inflated at this point.

SPACECRAFT John, (garble).

CAPCOM    Roger, say again Vance, we didn't understand.

SPACECRAFT Does not appear that the stades were fired.

CAPCOM    Roger, understand Vance. Challenger, Houston, if somebody could take the payload ox bus to off, please.

SPACECRAFT Okay John, we'll get the payload ox to off.

CAPCOM    Roger, thanks a lot.

PAO       This is Mission Control, Houston. It appears the balloon is not going to inflate some stades are inhibiting the inflation of that device and Flight Director Randy Stone remarks that it looks like we have a can to rendezvous with rather than a balloon. We are getting radar data from it and we will be able to conduct rendezvous operations even though the balloon hasn't inflated. This is Mission Control. The radar shows the canister to be about 700 feet away from the Orbiter at this time, which is a big increase in the radar signal. Here at the Control Center, some suspicion that the balloon may have inflated now.

CAPCOM    Challenger, Houston, we just saw a large increase in radar signal strength, can you tell whether or not, the IRT inflated?

SPACECRAFT Negative John, it has not inflated.

CAPCOM    Roger, I understand.

PAO       This is Mission Control. It looks like the increase in the radar signal is a product of the crew having gone to high power on the radar.

SPACECRAFT John, Houston, Challenger.

CAPCOM    Roger, go ahead Bruce.

SPACECRAFT Roger, I'm watching them through (garble) binoculars to get a good view. It's still rotating slowly. It looks like the white thermal cover is still on the top of it. It doesn't look like there's been any sort of deployment activity at all. I can see a small lanyard near the base of it, two small lanyards, two small wires sticking out. They look like they are about 6 inches long and they're about 1 inch apart from each other. They are sticking radially out. The bottom end of
the thing is there and of course, the top is all covered with the thermal cover, over.

CAPCOM Roger, thanks a lot, Bruce for the very good report.

PAO This is Mission Control, Houston. The Rendezvous Officer here in the Control Center reckons that we should be able to track that canister for a distance of about 30 miles from the Orbiter which makes some of our rendezvous and proximity operations feasible. However, the nominal plan was to drift away from the inflated balloon, even up to a distance of about 120 miles and then rendezvous and operate into the vicinity of it. And at least at this point, it looks like that may not be feasible.

SPACECRAFT Houston, you're not going to believe this but it's just now inflated and the stades are coming off.

CAPCOM Roger, understand Vance, that's really good news.

SPACECRAFT We'll tell you in a minute, we still don't know if it's fully inflated.

CAPCOM Rog, understand.

SPACECRAFT John, it looks like the balloon blew up. I'm checking a very large piece of plastic, it stayed white on one side and dark olive drab to black on the other side.

CAPCOM Roger, understand Bruce, we're standing by for ya'lls reports.

SPACECRAFT Houston, we have a range now of 1240 feet and stand by on the rates. The thing is jumping around so we can't give you what the range rate is.

CAPCOM Roger that.

END OF TAPE
SPACECRAFT We have a range now of 1240 ft, and stand by on the rates. The thing's jumping around, so we can't give you what the range rate is.

CAPCOM Roger that.

PAO This is Mission Control, Houston. There's still quite a bit of uncertainty in the control center as to the nature and condition of the balloon, whether it is inflated, partially inflated, or, in fact, whether it's blown up, and whether they may be tracking just a torn piece of the exploded balloon. The radar data that we're copying here in the control center is very noisy, and I get a lot of jumping around on it, so we're going to have to wait until we get a concise assessment from the crew before we're able to determine the status of proximity OPS.

SPACECRAFT Okay, Houston, Challenger.

CAPCOM Roger. Go ahead, Vance.

SPACECRAFT John, some question in my mind whether we should do the initial SEP burn. It isn't equivalent to a jettisoned IRT configuration. It's not a blown up balloon. It's something in between. Matter of fact, we're not real sure the weight is still attached to the balloon itself.

CAPCOM Vance, we'd like to go ahead and do nominal SEP, and we will think about it more, and talk with you more outbound.

SPACECRAFT Okay.

PAO This is Mission Control, Houston. Flight Director Randy Stone, deciding to do the nominal separation burn of 3 ft per sec.

CAPCOM Challenger, Houston. If you could give us an indication of when the MLR was deactivated, please.

SPACECRAFT Standby. We're getting that for you.

SPACECRAFT Houston, this is Challenger. We are still tracking the, what appears to me, Bruce, to be the fabric of the balloon. We're out to 2,200 ft right now. I've been looking at it as best I could through the gyro stabilized binoculars, and although I can't tell positively, it does not appear to me that the canister with a few hundred pounds of weight is still with this piece of fabric. I've also been looking around the horizon and I can't find anything that I can positively pick out as the canister. Over.

CAPCOM Roger. Copy, Bruce. Thanks a lot.
And Houston, Challenger.

Roger. Go ahead, Vance.

Okay. I quick checked questions for the back room. In loading basetime, I would normally go to target SEP 5. That's not shown in block 10. Is it desired to do that, with target SEP 0, or target number 0?

Roger. Standby and I'll get you an answer, Vance. Roger. Rendezvous advises target 0 is fine for that, Vance.

Okay. Just wanted to be sure of things.

Understand.

Bruce, just for your information, your observations and what you have been seeing have been very useful to us in determining whether or not we ought to continue with the TI burn, etc. As you are watching it, if you can give us any more information about the relative situation of canister versus fabric, we'd appreciate it.

I'm having a lot of trouble reading you, John. I understand you want me to just keep you posted on the situation as it progresses. Over.

That's affirmative, Bruce. What you have been telling us to date has been very helpful, and it will help us determine whether or not we ought to continue with the TI maneuver.

Okay. Thank you, and Hoot took a look also with the gyro stabilized binoculars, and although he can't be a hundred percent sure either, he confirmed my observations on the can not being there.

Understand.

END OF TAPE
SPACECRAFT ...he confirmed my observations on the can not being there.

CAPCOM Understand. Challenger, Houston, our current plan is to continue this maneuver out through S3R and at that time we will make a decision as to whether or not to continue.

SPACECRAFT John, we had some time precision in here, please repeat.

CAPCOM Roger, Vance. We would like to continue the procedures per the timeline out through the S3R burn and then we will make a decision whether or not to continue.

SPACECRAFT Copy.

PAO This is Mission Control Houston. It's 1 day, 23 hours, 25 minutes Mission Elapsed Time and there is still a high degree of uncertainty as to the precise nature of the IRT at this point. The indications are, we're getting low signal strength and a lot of noise in the radar return, the nature of which suggests that the target to the IRT is changing its reflective area and that promotes the suspicion that the balloon has in fact blown up and what we're tracking is a large shredded portion of it. And accordingly, it doesn't look prudent or productive to attempt to do a profound separation maneuver from it and try a little later on to rendezvous with it inasmuch as the probability of reacquiring it on radar is fairly remote. It's all still certainly under discussion here, however, and...

CAPCOM Roger, copy that.

SPACECRAFT And are you seeing the (garble). Yes, are you seeing those on downlink?

CAPCOM Stand by 1, Vance, I'll try to get an answer on your COAS marks. We're standing by for Bruce, we're going LOS TDRS in 2 45.

SPACECRAFT Roger.

CAPCOM Challenger, Houston, just for your information, Guidance can not see COAS data.

SPACECRAFT Okay, presume it gets dumped.

CAPCOM Roger that, and it does go on the recorder.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Vance.
SPACECRAFT  John, it would appear that the radar is tracking where the large fragment of balloon is. In other words when Bruce is taking his marks off the COAS, the radar is looking at about the same spot. Although we can not see the (garble) I suppose we can see (garble).

CAPCOM  Roger, Hoot, you're breaking up, our comm probably is not bad. We're going LOS TDRS here in one minute, we'll see you at Yarragadee at 23 plus 38.

SPACECRAFT  Okay, we'll see you there.

PAO  This is Mission Control, Houston, we're LOS through the TDRS system and acquire Yarragadee in almost 9 minutes from now. Last couple of transmissions were fairly faint as we're on the fringes of TDRS coverage and there is still some discussion going on in the control center as to the probable nature of the target we're tracking. A shredded portion of the balloon doesn't, clearly doesn't present as large a radar signal as would the fully deployed balloon. And moreover with the balloon having exploded and the other portions of the balloon system in the vicinity of that debris, including that 200- pound ballast weight, it is some question of the flight director whether it's some...

END OF TAPE
PAO -- other portions of the balloon system in the
vicinity of that debris, including that 200 lb ballast weight.
It is some question of the flight director whether it's prudent
to try to conduct proximity operations in the vicinity of objects
which we can't track with a high degree of confidence. Payloads
officers now making a record of the probable sizes and colors of
the various components of the IRT system which will be uplinked
to the crew over Yarragadee, so we may have a better chance to
identify what the nature of the debris in that target material
out there, and we'll be talking through Yarragadee in just about
7 min at Mission Elapsed Time, 1 day, 23 hr, 32 min. This is
Mission Control, Houston.

CAPCOM Challenger, Houston with you at Yarragadee for 6-
1/2 min.

CAPCOM Challenger, Houston with you at Yarragadee for 6
min.

SPACECRAFT Roger, Houston. We copied you loud and clear.
I've got MLR deactivation time. That was 21 - 21 hr, 37 min,
21:37, and I'm ready for the postdeact if I can get a go.

CAPCOM Roger. We copy, and stand by one, Ron. We'd like
to pass this to y'all. We do not want to do the S2. I repeat,
do not do S2. We would like to continue with the track schedule
per the checklist for a while, and we would like to delete the
radar brake lock tests, block 13 and block 15.

SPACECRAFT Okay, John. Understand you wish to delete, that
is, not perform blocks 13 and 15. Is that correct? Over.

CAPCOM That is correct. And we do not want you to do an
S2 burn.

SPACECRAFT Okay. We've targeted the burn, but we've called it
off. Would you like the data?

CAPCOM Roger. Stand by one, Vance. Vance, before we get
that data from you, we would just like to make sure that you
understand that we would like to delete all further rendezvous
burns.

SPACECRAFT Okay. We'll delete all further burns. All future
rendezvous burns.

CAPCOM Roger, and Ron, we are go for the MLR postdeact,
and Vance, we are ready for your data.

SPACECRAFT Okay. S2, starting delta VX. Final solution minus
3 balls decimal 5, minus 2 balls decimal 2, minus 01.7, and total
is 001.8.
CAPCOM  Roger. We copy, Vance. Thanks for the data.

SPACECRAFT Roger, and we've been maintaining good radar lock.

CAPCOM  Understand.

PAO  This is Mission Control, Houston. As stated by CAPCOM, John Blaha, there'll be no separation burn, the maneuver burns executed as planned for these rendezvous operations as a prudent measure, and we will continue to take radar data using the Orbiter's rendezvous radar tracking the larger objects among the debris produced by the deployment. Mission Elapsed Time is 1 day, 23 hr, 44 min, and we'll be in voice contact with Yarragadee for another 2-1/2 min.

SPACECRAFT John, what you just saw on the radar was a spontaneous brake lock, and reacquired the GPC mode. Over.

CAPCOM  Roger. Thank you, Bruce, for the report, we currently do not have data.

SPACECRAFT It was about 19,500 ft, or 19,600 ft when it broke lock. It locked back up all by itself again at about 19 ---

END OF TAPE
CAPCOM  Roger, thank you Bruce for the report. We currently do not have data.

SPACECRAFT  It was about 19,500 feet or 19,600 feet when it broke lock. It locked back up all by itself again at about 19.8 and currently we're out to 20,700.

CAPCOM  Roger, understand and, Bruce, any data y'all can pass to us in the next minute and 50 seconds, we would appreciate it because we don't have any data.

SPACECRAFT  Okay, on Spec 33, the rendezvous radar numbers are, (garble) it here a second, range 21.064 R dot plus 13.00, L minus 0.8, azimuth minus 1.8, omega R plus 142 omega R plus 0.1. The filtered state is range 20.834, R dot plus 16.34, beta 335.62, Y minus 0.13, W dot plus 0.4, on the marks on range we have 373 accepted, no rejects, R dot, 330 accepted, 35 rejects. Angle track, 371 accepted, no rejects. Filter minus PROP position, 5.56, velocity 6.67, over.

CAPCOM  Roger, thanks a lot for the good data, Bruce.

SPACECRAFT  Okay, you can get that off your recording.

CAPCOM  Roger and Bruce, we're going LOS here in 40 seconds from Yarragadee, we'll see you guys at Hawaii at 00 plus 05 and here on the ground, people have worked up some numbers for you. We think you're going to lose it entirely at 26,000 feet.

SPACECRAFT  We'll be watching it closely, John.

CAPCOM  Roger that.

PAO  This is Mission Control, Houston. We're out of range of Yarragadee now and pick up voice and data again through the TDRS system. In about 17 minutes, no we'll pick up through Hawaii in 17 minutes on orbit 33. The IRT or the fragment of it that is being tracked is about 4 miles behind the Orbiter. And based on the data that we're observing here where the tracking radar and the Orbiter begins to break lock between 20,000 and 26,000 feet. The Guidance/Navigation Control Officer here expressed that serious doubt as to whether they would be able to reliably track the object or lose it perhaps entirely at about 26,000 feet, at a range of 26,000 feet. Accordingly, all the burn maneuvers have been cancelled. Again in as much as there's a piece of ballast that weighs 200-250 lbs as part of that IRT. The system, is of questionable wisdom to perform blind maneuvers around that without knowing precisely where that ballast is located and to avoid the chance of banging the Orbiter into it while those separation maneuvers won't be performed. But we'll continue the tracking, acquiring tracking data using the Orbiter
radar and star tracker. At mission elapsed time, 1 day, 23 hours, 50 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you at Hawaii for 7 minutes.

SPACECRAFT Okay, John, we copy. We had good solid lock on the rendezvous radar out to 37 point 904, that's 37 thousand feet, 904 feet. I show it still trying to lock back up. We're out to 40,400 right now but it doesn't seem to be able to get a lock. With your permission, I'm going to go ahead and inhibit --

END OF TAPE
CAPCOM        Roger. We see that, Bruce, and we concur.

CAPCOM            Challenger, Houston. Just for your information, we
still want you to go ahead and stay on the sensor timeline that
you have in the checklist there. We are hoping to get some
startracker data when that timeframe calls for it, and when
someone has an opportunity, if you could give us the SPAS deact
time, please.

SPACECRAFT        Roger. We'll get that for you. And John, if you
want, we can give you our S3, the final solution and S3 R
preliminary.

CAPCOM        Roger, Vance. I'm ready to copy.

SPACECRAFT        Okay. S3, the TIG was 2/00:00:52, final P delta VX
minus 3 balls decimal 9, plus 2 balls decimal 6, minus 2 balls
decimal 2, total 1.1.

CAPCOM        Roger. Copy, Vance. Thank you for the data.

SPACECRAFT        And S3 R if you're ready for preliminary.

CAPCOM        Ready for that.

SPACECRAFT        TIG 2 days/00:06:12. Delta VX minus 003.2, minus
00.4, plus 01.8. The total of 3 decimal 7.

CAPCOM        Roger. We copy. Thank you very much, Vance.

SPACECRAFT        Roger.

SPACECRAFT        And John, I can give you some of the data off spec
33 at the time that radar broke lock if you like. Over.

CAPCOM        Roger. We'll take that, Bruce. Thanks.

SPACECRAFT        Okay, the last radar range that I had was 37,904.
At that time, I froze the spec. The filtered state was reading
38,048, that's 38,048. R dot plus 14.59, Theta 347.32, Y plus
0.27, Y dot plus 3, filter minus prop position, 11.62, that's
11.62. Velocity 12.27, that is 12.27, and in the remarks
history, we got 507 marks in range with 0 rejects. Range rate
456, excuse me, 453 marks with 46 rejects, and 505 marks in
elevation and azimuth. Note that we are currently showing 508
SPACECRAFT: -- radar out to 37.904. That's 30 - 37,000 ft, 904 ft. I show it still trying to lock back up. We're out to 40,400 right now, but it doesn't seem to be able to get a lock. With your permission, I'm going to go ahead and give it auto marking, and we'll just sit here and watch it for a while and see if anything else happens. Over.

CAPCOM: Roger. We see that, Bruce, and we concur.

CAPCOM: Challenger, Houston. Just for your information, we still want you to go ahead and stay on the sensor timeline that you have in the checklist there. We are hoping to get some startracker data when that timeframe calls for it, and when someone has an opportunity, if you could give us the SPAS deact time, please.

SPACECRAFT: Roger. We'll get that for you. And John, if you want, we can give you our S3, the final solution and S3 R preliminary.

CAPCOM: Roger, Vance. I'm ready to copy.

SPACECRAFT: Okay. S3, the TIG was 2/00:00:52, final P delta VX minus 3 balls decimal 9, plus 2 balls decimal 6, minus 2 balls decimal 2, total 1.1.

CAPCOM: Roger. Copy, Vance. Thank you for the data.

SPACECRAFT: And S 3R if you're ready for preliminary.

CAPCOM: Ready for that.

SPACECRAFT: TIG 2 days/00:06:12. Delta VX minus 003.2, minus 00.4, plus 01.8. The total of 3 decimal 7.

CAPCOM: Roger. We copy. Thank you very much, Vance.

SPACECRAFT: Roger.

SPACECRAFT: And John, I can give you some of the data off spec 33 at the time that radar broke lock if you like. Over.

CAPCOM: Roger. We'll take that, Bruce. Thanks.

SPACECRAFT: Okay, the last radar range that I had was 37.904. At that time, I froze the spec. The filtered state was reading 38,048, that's 38.048. R dot plus 14.59, Theta 347.32, Y plus .27, Y dot plus .3, filter minus prop position, 11.62, that's 11.62. Velocity 12.27, that is 12.27, and in the remarks history, we got 507 marks in range with 0 rejects. Range rate 456, excuse me, 453 marks with 46 rejects, and 505 marks in elevation and azimuth. Note that we are currently showing 508
456 and 506 indicated we got a couple of partial marks in after initially lost lock and it kept on trying to reacquire. Over.

CAPCOM Roger. Copy, Bruce. Thanks a lot for the good information.

SPACERCAFRT And John, advise that we're going to do a correction on that burn, S3R. We did not change the time on it. We will.

CAPCOM Okay.

SPACERCAFRT John, (garble). And Houston, do you want us to remain in the radar mode here, or should I give the Ku back to you for comm? Over.

CAPCOM Stand by, Bruce. I'll see what INCO and flight want to do.

SPACERCAFRT Okay.

SPACERCAFRT Got a temporary piece of data at 44,000 ft.

END OF TAPE
STSW-41-B AIR/GROUND TRANSCRIPT t103j 036:13:10 2/5/84 PAGE 1

CAPCOM Stand by Bruce. I'll see what INCO and Flight want to do.

SPACECRAFT Okay. Got a temporary piece of data at 44,000 feet.

CAPCOM Challenger, Houston. We'd like to leave the radar in the radar mode as long as possible and keep trying to track.

SPACECRAFT Okay, thank you, John. John, that's 5 deactivation came at 20 plus 43, over.

CAPCOM Roger. Copy, Ron, thanks a lot.

CAPCOM Challenger, Houston. We're going LOS Hawaii here 20 seconds. See you on TDRS, couple of minutes.

SPACECRAFT Roger.

PAO This is Mission Control, Houston. It's 2 days, 0 hours, 12 minutes mission elapsed time. We're losing acquisition through Hawaii and just a brief keyhole here until we pick up briefly on TDRS. Just to repeat the advisory given by Bruce McCandless, he reported that he had a good lock on the fragment of the IRT that he was tracking. A good strong lock out to 37,904 feet and at 40,400 feet wasn't able to get in lock at all. We'll continue to try to get sensory data. No maneuvering burns planned as yet, however, and the Flight Activity Officer here in as much as will be terminating rendezvous operations significantly earlier than planned. The Flight Activities Officer will begin to resculpture the day's activities and introduce new plans, new activities that will make this a more productive day in space in the absence of those rendezvous activities. We are getting data through TDRS. We'll have voice shortly. Guidance reports that the rendezvous radar has a good lock now on a target at 47,000 feet and he reports that with some degree of surprise.

PAO This is Mission Control, Houston. That lock turns out to be an intermittent phenomenon right now.

CAPCOM Challenger, Houston's with you with UHF at Goldstone.

SPACECRAFT Roger, Houston. And the radar was locked on momentarily at about 47,100 feet.

CAPCOM Roger, understand and we could, just for your information, our overall plan here - although it could change of course - through this TDRS pass we would like you to leave the radar in the radar mode until it stops acquiring an entire search
pattern and we will watch that for you. And when that occurs we'll let you know.

SPACECRAFT  Okay.

SPACECRAFT  Okay, John. It looked like he was locking up. We re-enabled locking. We've gotten half a dozen more marks in elevation and azimuth and one mark in range. Do you want us to leave marks enabled now or should we go back to inhibit.

CAPCOM     Stand by one. We'll let you know.

SPACECRAFT  And John, if you, if you're seeing spec 34 over Goldstone that's our S3R final.

CAPCOM     Roger, we understand, Vance, and y'all can go back to marks inhibit.

SPACECRAFT  Roger, John. We'll do that.

SPACECRAFT  Houston, this is Challenger. Are you reading us through TDRS, over?

CAPCOM     Bruce, I'm reading you on UHF only.

SPACECRAFT  Roger, Houston.

SPACECRAFT  Okay, John. As you can probably see we're locked on again good and solid with the radar at a range of --

END OF TAPE
Hey, John, as you can probably see we're locked on again, good and solid with the radar at a range of 51,000 feet now. It's been hanging in there for about a minute or so.

Roger, copy, Bruce. And we have a good lockup with MILA now. Challenger, Houston, if y'all would like to, we'd like to see the radar marks taken back to auto.

Okay, good, and we've got a first on the computation on TI, about 15 feet per second.

Roger.

I'm sorry Fl.

Roger, understand.

Okay, the marks are back to auto, and they're going in.

Houston, Challenger.

Roger, go ahead.

John, we're about 12 minutes from Fl, we could barely make it, if you wanted to, but I understand you're probably concerned about other pieces that came off.

Roger, Vance, understand, and just again to clarify it. We have terminated the rendezvous and we just wanted to continue to separate, but we're interested in getting work on a tracking data, we can get here including the startracker.

Yeah.

Houston, Challenger

Challenger, Houston, with you at Dakar, UHF.

Roger, Houston. We see the IRT and the COAS, just barely, and we think it's a good chance to get startracker marks, what's your preference first, startracker, COAS, or just follow the timeline.

Roger, stand by one, I'll try to get an answer for you. Challenger, Houston, what we would like to do, is do the startracker first, and if no joy, go out, go back to taking marks on the COAS.

Roger.
CAPCOM And Challenger, Houston, just be advised we're getting a lot of blanking to the S-band through TDRS from where we currently are, all the way through the rest of this TDRS pass, and we'll probably just be with you UHF here over at Dakar and Botswana.

SPACECRAFT Okay, understand.

CAPCOM Challenger, Houston. We're going to be going LOS here at Dakar, we'll see you at Botswana, UHF, and just for your information, we'd like you to go ahead and slip the RMS activity and we'll do it over Hawaii at 134, 39 AOS.

SPACECRAFT Well that's okay. John, (garble) it again, we're expected to do it at, ah, disregard.

CAPCOM Challenger, Houston, we're with you UHF over Ascension for another 5 1/2 minutes.

SPACECRAFT Roger. Okay, Houston, Challenger, we have startracker locked on the (garble).

CAPCOM Roger understand, sounds good, Vance.

SPACECRAFT And suggest we do a filter to prop now and then start taking data if that's okay.

CAPCOM Roger, we concur with you, Vance. Challenger, Houston, we're looking at your startracker data and it really looks good to us. We'd like you now to go ahead and select COAS, take about 6 marks, and then go back to startracker, please.

SPACECRAFT Roger.

PAO This is Mission Control, at 2 days, 0 hours, 48 minutes, mission elapsed time. Crew using the startrackers and the crew optical alignment system in observing the integrated rendezvous target, gathering what tracking data and other tests of the onboard navigational aids that would be used in rendezvous - -

END OF TAPE
This is Mission Control at 2 days, 0 hours 48 minutes, mission elapsed time. The crew using the startrackers and the crew optical alignment system in observing the integrated rendezvous target, gathering what tracking data and other tests of the onboard navigational aids that would be used in rendezvous that they can given that the rendezvous activity has been essentially terminated. The crew reported that they can see the IRT in the crew optical alignment site. And Brand reported that they used the startrackers, the Flight Controllers in Mission Control said the startrackers acquisition of the target was very good, and provides an important data point for them that they will make use of for the 41-C flight.

Challenger, Houston, going LOS here at Ascension UHF, see you at Botswana in 4 minutes.

Right.

Challenger, Houston, we're back with you at TDRS. Every now and then we'd lock up with you and if you're having trouble getting a lock on with the COAS, we refer you to the COAS nav cue card.

We're not having any problem, we're taking COAS marks, Houston.

Roger, understand, Vance.

We have 5 marks and the residuals have been extremely small, looks about like startracker.

Roger, understand, Vance, that sounds real good.

Bruce has a good eye. Houston, Challenger.

Roger, go ahead, Vance.

Okay, target is about 7 or 8 degrees above the horizon, we still have star presence and we have in 19 startracker marks following the 6th COAS marks.

Roger, understand, good show, Vance, sounds like you guys are doing a good job up there with that.

Challenger, Houston, we'll be going LOS TDRS, see you at Yarrgadee at 1+14.

Okay Houston, we'll see you at Yarrgadee.
This is Mission Control Houston, at 2 days, 1 hour, 6 minutes, mission elapsed time. Challenger is out over the Indian Ocean, having passed out of the range of the tracking data relay satellite. We have only had intermittent use of the TDRS on this last pass. Crew has been going through salvaging some of the rendezvous activities. Of course, as you may be aware there was a failure of the integrated rendezvous target, the balloon, earlier this morning, and that created some difficulties, of course, and has eliminated the ability to use that as a rendezvous target, and the additional concern that out in that vicinity is the 200 lb mass that was associated with the intergraded rendezvous target, that being between the Orbiter and the remnants of the fabric which the crew has been using to site on with the startrackers and the crew optical alignment system and the caution being taken by the crew and Mission Control in not doing any approaches so as to avoid the possibility of any contact with that 200 lb mass. Handover continues to go on here in Mission Control, from the flight control team of Randy Stone, which worked through the night and that Harold Draughon, they plan to do the rendezvous activities today. Some considerable replanning going on. Of course, the reshuffling due to the change in the rendezvous plans. Rendezvous activity plans and the still to be determined times and arrangements for the --
PAO they had planned to do the rendezvous activities today. Some considerable replanning going on. Of course, the reshuffling due to the change in the rendezvous plans, rendezvous activity plans and the still-to-be determined times and arrangements for the deployment of the Palapa Satellite. Flight Director Randy Stone's Change-of-Shift Press Conference will be a little delayed this morning. Instead of the 8:30 central time that we had originally scheduled, we're looking at something like 9:15 this morning. That due to the amount of planning and replanning activities that have had to have been conducted here and handover obviously taking a little longer than normal. The crew may be advised to lower the cabin pressure to 10.2 psi later in the day. That's part of the pre-breathe protocol leading up to the EVAs. Begin that today so that they can, those crewmembers who will be going outside on the EVA can start eliminating the nitrogen from their blood and in the event that an EVA should be scheduled as early as tomorrow. Of course, all those planning activities still being worked right now and we'll let you know as soon as anything firms up. Challenger's on orbit number 33 out over the Indian Ocean. We have about 4 minutes and 45 seconds before we pick up over the Yarragadee, Australia station. At 2 days, 1 hour and 10 minutes mission elapsed time this is Mission Control, Houston.

CAPCOM Challenger, Houston's with you at Yarragadee for 7 minutes.

SPACECRAFT Roger, Houston. We've terminated marking and surpassing the terminator. We have a total of 130 startracker marks and, stand by. We've lost sight with the COAS and the startracker somewhere around a range of 75,000.

CAPCOM Understand, Vance. Lost sight with both the COAS and the startracker around a range of 75,000 feet.

SPACECRAFT Roger, and that was due to the sun going down. Actually, just before we lost them the IRT was visually very bright.

CAPCOM Roger, understand. Thanks for the good report, Vance.

SPACECRAFT Couple of other things. After it got fairly dark around the IRT we think we could see a couple of other pieces that were much dimmer but going along perhaps below us. And another note, after the sun went down, why the startracker jumped to a star we think because residuals and ratio got pretty high. Ratio actually got up to 6.

CAPCOM Roger. Understand, Vance. Thanks for the data.

SPACECRAFT Houston, Challenger.
CAPCOM          Roger, go ahead, Vance.

SPACECRAFT     Would you like to disable rendezvous NAV or is there a possibility we might look at the target again the next time around.

CAPCOM          Roger, Vance. Do not disable rendezvous NAV. We're thinking now of trying to look at it again when we get to the next daylight pass.

SPACECRAFT     Okay.

CAPCOM          Challenger, Houston. We're going LOS Yarragadee in 30 seconds. See you at Guam for a short pass in 7 minutes.

SPACECRAFT     Okay. Okay, John. We'll see you there.

PAO             This is Mission Control at 2 days, 1 hour, 27 minutes mission elapsed time. We may pick up a very brief amount of communication over the Guam station here in another minute. That Change-of-Shift Press Conference with off-going Flight Director Randy Stone has been slipped an additional 30 minutes to fit in better with other, the satellite playback activities and the RMS checkout that will preceeding that so that we don't overlap some of those things for the same time periods. So that Change-of-Shift Press Conference with Randy Stone now scheduled for 9:45 am central standard time here at the Johnson Space Center. During the recent passes there in the communication Vance Brand --

END OF TAPE
PAO — the RMS checkout that will be proceeding that so that we don't overlap some of those things for the same time periods. So that change-of-shift press conference with Randy Stone, now scheduled for 9:45 a.m. central standard time, here at the Johnson Space Center. During the recent passes there in the communication, Commander Vance Brand reporting that they had finally lost the contact with the intergraded rendezvous target or the remains of that target through the startrackers and crew optical alignment site after having gotten a number.

CAPCOM -- is with you at Guam for a couple of minutes.

PAO — a number of sites.

CAPCOM Challenger, Houston, going LOS in 30 seconds, see you at Hawaii, 8 minutes.

SPACECRAFT Roger

PAO --- This is Mission Control, no significant communication over the Guam pass, very low elevation pass. We'll pick up over Hawaii in about 9 minutes, 8 minutes, 45 seconds from now. Significant replanning activity going on here in Mission Control. The day had been layed out to be taken up by the rendezvous activities with the integrated target, but earlier on in the deployment of that the target itself experienced a failure and apparently the balloon exploded, so we only have the fragments of the flat, white color balloon, which are some distance away from the Orbiter and the distance is increasing. And then somewhere between the Orbiter and the fragments of those balloon, of the balloon which the crew has been getting some tracking data on, somewhere between those two is the 200 lb weight, which was a part of the integrated rendezvous target. The rendezvous activities have been terminated. The crew would have been, had the balloon properly inflated, would have been moving in close with that, and practicing their radar techniques, using some of their siting equipment on it. But it's felt to be not too safe to be moving in close on that fabric of the balloon even though it is, has been quite visible, given that between those two is that 200 lb mass. However, the crew has been using the startrackers. Those pieces of equipment which normally acquire a pair of stars, takes sightings on stars and use that to help the Orbiter navigation system, calculate its position. They've taken sightings on that, and have used the crew optical alignment system to get readings on the fabric of the integrated rendezvous target. Vance Brand reported over the Yarargadee pass that they finally lost sight at about 75,000 feet range due to the sun going down, losing the reflection off of that target, but he did note that it was quite bright just before they lost the sun. So they had good visual contact with the IRT's fabric. He was notified not to disable the rendezvous radar, that they may attempt to do some more work with that at, do some of the other
activities with remnants of the IRT as they get back in daylight. We are about 5 minutes 45 seconds away from contact through Hawaii. To repeat again, the change-of-shift press conference now scheduled for 9:45 with off-going Flight Director Randy Stone. 2 days 1 hour, 34 minutes, mission elapsed time. This is Mission Control Houston.

CAPCOM    Challenger, Houston is with you at Hawaii for 8 minutes.

CAPCOM    Roger, Houston. (garble)

CAPCOM    Roger, and be advised you're coming through a little broken, and we'd like to tell you that the entire team down here would like to thank you for all the good data you're collecting and let you know that the radar COAS and startracker sensor data will be a big help for future rendezvous planning. The preliminary close-in nav data shows the nav is doing what it is suppose --

END OF TAPE
CAPCOM Roger, and be advised, you're coming through a little broken. And we'd like to tell you that the entire team down here would like to thank you for all the good data your collecting, and let you know that the radar, COAS and startracker sensor data will be a big help for future rendezvous planning. The preliminary close-in NAV data shows that the NAV is doing what it is suppose to do.

SPACECRAFT Ok, glad to hear it, John, and we will get some more longer range startracker data for you, too.

CAPCOM Roger that.

SPACECRAFT Hey John while you're on the line, you can report that the cabin measurement DTO is accomplished.

CAPCOM Roger that, super job, Bob. And Challenger, Houston, just be advised we're going to be taking TV now.

SPACECRAFT Ok John, we've started the RMS checkout.

CAPCOM Roger that.

SPACECRAFT Houston, Challenger, we have completed steps 1 and 2 of the RMS power up. We've got the (garble) position message, which we thin is a power transient.

CAPCOM Copy that, Ron, suggest an ITEM 12 and an ITEM 11 on SPEC 94.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Ron.

SPACECRAFT I saw this port (garble) release talkback barberpole now. (Garble) a gray talkback during post-insertion. Oh, now it just went gray. (Garble) just went gray. I guess you got that message.

CAPCOM Ok, Ron, we'll disregard it, and we're seeing a good release here on the ground.

SPACECRAFT Yes, it looks like that was a delayed talkback.

PAO And this is Mission Control at 2 hours, 2 days, 1 hour, 48 minutes Mission Elapsed Time. We're going through the checkout of the Remote Manipulator System. Mission Specialist Ron McNair talking with the ground here about the checkout and the release of the supports at the various joints.

CAPCOM Challenger, Houston, on TDRS.
SPACECRAFT  Got you loud and clear, Jerry. Ok, step 3 is complete going to RMS checkout.

CAPCOM  Copy, Ron, thank you. Challenger, Houston for Bruce or Vance.

SPACECRAFT  Go ahead, Houston.

CAPCOM  Roger, Challenger, we don't think we want to do any more work with Rendezvous radar, we think we're beyond range where we can get any meaningful data. Therefore on SPEC 33, we'd like to do another ITEM 2, make sure we have no asterisks at that time. And then on panel A1, Ku control to command.

SPACECRAFT  Copy.

PAO  This is Mission Control. We see the 50-foot long Canadian built Remote Manipulator System out of its cradle and all the joints flexing on that.

SPACECRAFT  Houston, Challenger.

CAPCOM  Go ahead, Vance.

SPACECRAFT  Did you want an ITEM 1 as well?

CAPCOM  That's a negative, not yet on that one, Vance. We'd like to continue to get some startracker and COAS, I believe.

SPACECRAFT  Yes, ok, that's what I thought. So we've done the ITEM 2, and Bruce is taking care of the switches.

CAPCOM  Ok, copy, thank you. Challenger, Houston, for Vance.

END OF TAPE
That's what I thought. So we've done item 2 and Bruce is taking care of the switches.

Okay. Copy, thank you.

Challenger, Houston for Vance.

Houston, go ahead.

Roger Vance. For your information, post RMS checkout - right now we're anticipating doing a mass spec CAL. You may want to look at that and get yourself refreshed.

Understand post RMS checkout. Looking at doing a mass spec CAL.

That's affirm Vance.

Jerry, this is Bruce on CRT 4 up here. I'm looking at the MMU, that is the manned maneuvering unit FSS temperatures if you all want to take a look.

Okay Bruce. I'll see if the EVA guys have that capability down here.

Okay or I can read them down.

Challenger, Houston. Be advised we're going to be selecting camera bravo for downlink so we can watch the end effector checkout.

Jerry (garble).

This is Mission Control. 2 days, 1 hour, 57 minutes. A lot of cloud cover.

(Garble).

Over northern Mexico.

-- (garble).

Yes Jerry, we're having a problem getting the b camera to see the end effector and we have a lot sun glare (garble). We're considering either reorienting the arm slightly just out of range of the camera or unless the lighting gets better, unless the lighting gets better. We can move (garble) the arm and probably get to see it.

Okay Ron. That's your call. We just wanted to watch what you were doing. That's the only reason we selected the downlink. And Challenger, for Bruce.
SPACECRAFT  Go ahead Jerry.

CAPCOM  Bruce, we'd like you to go ahead and read us the MMU temps.

SPACECRAFT  Houston, this is Challenger. Go ahead.

CAPCOM  Roger Bruce, Houston. We would like you to go ahead and read us the MMU temperatures.

CAPCOM  Challenger, Houston for Bruce. We had a short comm dropout. Bruce, we'd like you to go ahead and read down the MMU temps.

SPACECRAFT  Jerry, Bruce - we'll relate to Bruce. He's having a little bit of comm problem and he's changing out his headset and he'll get those MMU temps for you.

CAPCOM  Okay fine. We had a comm drop at the same time. That was a confusion.

PAO  This is Mission Control looking into the end of the end of the end effector on the RMS, that part which grapples onto satellites or attachment points - anything which the arm would be picking up. And in the background there you see the Gulf of Mexico as the Orbiter crosses the coast and now is over the western Gulf.

SPACECRAFT  Houston, Challenger. How do you read?

CAPCOM  Roger Bruce. Loud and clear. Go ahead.

SPACECRAFT  Okay. Reading as they come up on the spec. I'll give you first the port and then the starboard unit values. FSS toggle valve left: +78, +102. Toggle valve FSS right: +94, +99. MMU toggle valve MMU left: +39, +45. Toggle valve MMU right: +43, +43. CN2 tank left: +41, +40. Tank right: +37, +42. CEA: +55, +57. Over.

CAPCOM  Okay Bruce. We copy those.

SPACECRAFT  Roger.

PAO  This is Mission Control and we see the wire snare system inside the end effector.

END OF TAPE
PAO — inside the end effector. And this is Mission Control at 2 days, 2 hours, 6 minutes mission elapsed time. The Challenger passed out of range of the Mila station where we were getting our television picture. During the last few moments, watching, looking into the end effector on the remote manipulator system where we saw the functioning of the wire snares, the system which latches down on to grapple fixtures which are the fixtures mounted on pieces of hardware intended to be picked up by the mechanical arm. The crew is going through the checkout of the remote manipulator system in preparation for it's uses later in the flight. They simply power it up, move it out of it's cradle, check the joints and the various drive modes, make certain that the end effector is working. Check out the cameras and then they will restow the RMS. A little earlier Commander Vance Brand was asked to go ahead and deactivate the rendezvous radar system. We don't anticipate any further opportunities to be using that with the remains of the integrated rendezvous target. Earlier today when that target was deployed and preparation for the rendezvous activities that were planned for today, it did not properly inflate. It was unable apparently to escape from its container and it appears that it partially inflated out through the ends of the container, and then given that it was still confined in part by the container, appears to - that the balloon ruptured. We then did have some fragments of that, which were useable in a limited way. The crew used the star trackers and the crew optical alignment site to gather data, close in data that they would have, have used the full balloon for. Sighting in on the flat white colored fabric of the integrated rendezvous target balloon and the crew did get some good use out of those systems and were able to demonstrate that those would be useful in the close in rendezvous work. They finally did lose sight of the IRT at a range of about 75,000 feet when the Orbiter and IRT went, went into the earths' shadow, were no longer in sunlight. However, Vance Brand reported that even at that range the IRT was very bright, and observable until they lost the sunlight off of it. The Flight Controllers here at Mission Control, proceeding through replanning activities, given that today was scheduled to be set aside for the integrated rendezvous target, rendezvous operations. Now those rendezvous operations have been cancelled and hope to be making a decision fairly shortly on whether to take today's opportunity for a Palapa deploy. So, that replanning activity is underway and we'll be advising you when things begin to firm up.

SPACECRAFT Hey Jerry, the end effector looks good. The hand controller so far looks good. We're in the midst of step (garble).

CAPCOM Copy that Ron, thank you.

SPACECRAFT Step 8 is complete.
CAPCOM       Roger, Ron. Believe copied that the RMS checkout is complete.

SPACECRAFT    That's affirmative.

CAPCOM       Okay.

SPACECRAFT    Sorry about that (garble). We had too much sunlight in here and we don't have window shades up.

CAPCOM       Challenger, Houston. We're back with you after a drop again on TDRS.

SPACECRAFT    Okay, Jerry. We got you loud and clear, and let's see, Ron has powered us up the flight deck camera now.

CAPCOM       Okay copy that. I think we're low data rate on TDRS now so we're not getting any TV. At least it's not, well maybe we are. I was looking at the wrong TV projection here on the ground. Hoot I've got a note for you, if your--

END OF TAPE
CAPCOM    Challenger, Houston, we're back with you after a drop again on TDRS.

SPACECRAFT   Okay, Jerry. We've got you loud and clear, and I'll tell you, Ron has powered us up a flight deck camera now.

CAPCOM    Okay, copy that. I think we're low data rate on TDRS now so we're not getting any TV. At least it's not, well maybe we are. I was looking at the wrong TV projection here on the ground. Hoot, I've got a note for you if you're ready to copy concerning mass spec ops.

SPACECRAFT   Okay, go ahead Jerry.

CAPCOM    Okay Hooter and we are not getting high data rate out of TDRS only low data rate. In Payload Ops page 3-8, if you want to turn to that.

SPACECRAFT   Okay. Standby just a second. And now Jerry, what are we --.

CAPCOM    Challenger, Houston, UHF through Ascension.

SPACECRAFT   (Garble) could you give me some instruction on that?

CAPCOM    Ok, Ron. We didn't copy all of that. Go ahead again.

SPACECRAFT   Asking what's our next step with the arm? Should we stow it or leave it in its current position?

CAPCOM    Let me ask RMU. Ron, we're ready to go ahead and stow the arm.

SPACECRAFT   Okay, in work. Okay Jerry, we're ready to copy your note. Say the page number again.

CAPCOM    Ok, 3-8 mass spec attached, Hoot.

SPACECRAFT   Houston, Challenger.

CAPCOM    Go ahead Challenger.

SPACECRAFT   Payload Ops, page 3-8.

CAPCOM    Okay, Hoot. After we go LOS TDRS here, after we go into sunset, you no longer can perform any additional star tracker work with the balloon. We would like you to initiate mass spec attached, page 3-8, performing steps 1, 2, and 3. And I have a change in your attitude midway on page 3-9.
CAPCOM Okay Hoot. We would like to change the body vector to +1, and omicron to zero.

SPACECRAFT Okay Jerry. Copy body vector change to +1, omicron to zero.

CAPCOM Roger that, Hoot. And that's consistent with the orientation that you've got right now. And after you have completed step 2 of that procedure, you are go to maneuver to -ZLV nose forward. Over.

SPACECRAFT Ok, let me read that back. After we complete step 2, we're go to go back to -ZLV nose forward.

CAPCOM That's a good copy, Hoot. And Challenger, Houston for Hoot.

SPACECRAFT Go ahead, Jerry.

CAPCOM Okay Hoot, one additional request. When you do the activation of SPAS for the mass spec work, also asking that you activate MOMS. That'll allow us to get it warmed up for a data take about an hour after that.

SPACECRAFT Okay, we copy activate MOMS also.

CAPCOM Roger. Challenger, Houston. We're having problems keeping lock on TDRS. We're about 30 seconds LOS. Ascension will be with you in 4 minutes on Botswana. And for Vance or Bruce, we're wondering how the star tracker and COAS work is going.

CAPCOM Challenger, Houston through TDRS. Challenger, Houston through TDRS.

SPACECRAFT Roger, go ahead Houston.

CAPCOM Roger Vance. Just had a comm drop and let you know we're back with you. We see that you've got star tracker auto again for some more marks. We're wondering also if you can see the target visually through the COAS yet.

SPACECRAFT That's affirm. We sure can.

CAPCOM Challenger, Houston for Vance and Bruce.

SPACECRAFT Go ahead.

CAPCOM Okay Vance. Just like last time, we'd like you to go ahead and get 6 COAS marks and then go back to star tracker.
SPACECRAFT: Ok, the -- tracker, then 6 COAS, then star tracker. This time you want to start with COAS, correct?
CAPCOM: That's affirm.
SPACECRAFT: Okay.
END OF TAPE
CAPCOM   -- we'd like you to go ahead and get six COAS marks and then go back to startracker.

SPACECRAFT   Okay, the -- tracker, then six COAS, then startracker. This time you want to start with COAS, correct?

CAPCOM   That's affirm.

SPACECRAFT   Okay.

PAO   This is Mission Control with 2 days, 2 hours, 29 minutes. Crew reported that they could visually see the fragments of the fabric of the integrated rendezvous target balloon through the crew optical alignment system. They are at least 20 nautical miles distant from that piece of fabric right now.

CAPCOM   Challenger, Houston for Ron.

SPACECRAFT   Go ahead Jerry.

CAPCOM   Okay, Ron. One reminder, we see you're trying to get the arm cradled. Be advised that that aft ready-to-latch talkback is in OP in the vehicle due to a wiring problem. You'll have to look at spec 94 to get good indications.

SPACECRAFT   Roger Jerry. We were having a problem getting the, getting both micro-switches on the mid to make. So we were trying readjusting to see if we can get (garble) on the mid. And - and Jerry check on that aft one because I think we got briefed at KSC right before the flight that the aft one, that they had fixed the wiring to it.

SPACECRAFT   Yes Jerry we did show a (garble) apart on cradling on all three MPM's.

CAPCOM   Okay copy all that. You were closer to the source than we were there at launch. And just another reminder that one talkback on each of those is good enough for cradle, or for latching.

SPACECRAFT   Houston, Challenger.

CAPCOM   Go ahead Challenger.

SPACECRAFT   Yes, Jerry, we have indications of possibly two bad micro-switches on the mid MPM. As we drive the elbow down into the cradle, we can see out the window that we are in position to have ready-to-latch indications. We're not getting those ready-to-latch indications on either the DNC panel nor the CRT. As we keep driving the elbow, we eventually lose the
shoulder, which says that we're probably driving through and those talkback are just bad, over.

CAPCOM  Okay. We copy that. Ron, we've been seeing that on the ground. Standby, I'll see what they want to do.

CAPCOM  And Challenger, Houston for Ron.

SPACECRAFT  Go ahead Jerry.

CAPCOM  Okay Ron, you're go to use the visual T marks for latching.

SPACECRAFT  Okay, will do.

CAPCOM  Challenger, Houston. A minute till we lose you on TDRS. See you next at Guam 03 +01.

SPACECRAFT  Okay, Jerry see you at Guam.

PAO  This is Mission Control Houston at 2 days, 2 hours, 40 minutes mission elapsed time. Challenger is about to pass out of range of the tracking data relay satellite over the Indian Ocean. Crew has during the last portion of the TDRS pass continued to take sightings of the fabric of the integrated rendezvous target balloon through the crew optical alignment site, and they can observe that uninflated balloon fragment at a distance of greater than 20 nautical miles. Flight Directors, Flight Controllers here in Mission Control are continuing to plan trying to put together the crews activities here based upon when the major activities of deployment of the payload, the Palapa satellite and the EVA's would occur now that the rendezvous activities have been cancelled due to the failure of the integrated rendezvous target balloon. We expect a decision later this morning, sometime after 10:00 from the payloads people as to when the deployment will actually be occurring and from that they can build the other flight activities accordingly. At, we're standing by for Change-of-Shift Press Conference with the off-going Flight Director, Randy Stone, in just a few moments. At 2 days, 2 hours, 41 minutes, this is Mission Control Houston.

END OF TAPE
PAO -- at 2 days, 2 hours, 41 minutes this is Mission Control, Houston.

CAPCOM Challenger, Houston. UHF only at Guam for 7 minutes.

SPACECRAFT Okay, Jerry. Jerry, we copy you loud and clear. We're into the SPAS activation to get those steps done. We worked with the arm awhile. We got it, all the talkbacks and got the arm cradled. We noted the arm is very, very sensitive to the positioning. We really had to push down into the MPM much further than we would have expected particularly on the shoulder and the elbow. But after playing, toying around with it we finally got all of the talkbacks and the arm stowed working the (garble).

CAPCOM Okay Ron. We copy all that. Thank you.

CAPCOM Challenger, Houston for Vance.

SPACECRAFT Go ahead, Houston.

CAPCOM Okay Vance. If you've got a couple of minutes I'd like to give you kind of a top level overview on what we anticipate for the rest of today and looking at tomorrow.

SPACECRAFT Okay, ready to copy.

CAPCOM Okay Vance. Rest of today will be SPAS activities. After we have done the mass spec activities we anticipate doing some yaw sensor work at sunset on this rev. Also be doing some modified Palapa temperature and health checks. IMU aligns, GAS A group, and the AEM activities. Also we're going to be sending up a shopping list of Cinema 360 work and then setting up the Cinema 360 for the deploy activities tomorrow. We'll be sending you up a detailed message as soon as we can get it all pulled together. Secondly, the initial look at tomorrow says Palapa deploy on 50 D. That would mean that we'd be looking at doing the depress prebreathe in the morning as well as the EMU water dump and recharge, over.

SPACECRAFT Okay. Copy all that.

CAPCOM And also Challenger, for whoever's at the aft station. We'd like the RMS camera selected back to elbow and with your permission once we get AOS TDRS this pass we would like to use the cargo bay cameras for looking around.

SPACECRAFT Okay, that's switch to elbow and regular cameras.

CAPCOM Okay, thank you much. We're just going to be looking around. There's nothing specific.
Okay Jerry, so I guess summary that's Palapa tomorrow. EVA the next day. Scratch 10. PSI cabin depress activities today. Do it tomorrow. Is that right?

That's correct understanding on that, Vance, and we'll be getting you up a detailed message as soon as possible.

Okay, thank you.

Challenger, Houston. We're 30 seconds LOS. Hawaii next in 6.

Challenger, roger.

Challenger, Houston with you through Hawaii for 7 minutes.

Hello, Houston. This is Challenger.

Roger, we copy and, Hoot, we have some modifications to your mass spec activities.

Go ahead with that, Jerry.

Say again.

Go ahead with those modifications.

Okay Hoot. We would like you to go ahead and proceed with steps 1, 2 and 3. However, we do not want to go to the minus ZLV nose forward attitude after step 2 as I previously had told you. Instead, if Vance is also listening, we would like to go ahead and continue (garble) nav through this sunlight pass coming up, continuing as the procedures call for on 3-21 of the rendezvous book, COAS followed by startracker. At the conclusion of this sunlight pass, we would like to terminate the rel nav using block 27 on page 3-21. And we would then like to go ahead and conduct the yaw sensor activities page 3-21 of the payload OPS. Over.
CAPCOM -- sunlight pass, we would like to terminate the rel nav using block 27, cn page 3-21, and we would then like to go ahead and conduct the yaw sensor activities, page 3-21 of the payload OPS, over.

SPACECRAFT Okay, understand that continuation of startracking, daylight pass when the sun get high enough, page 3-21 of the rendezvous book and after that payload checklist 3 days 21 yaw sensor test. Jerry, I copy steps 1, 2 and 3 of the mass spec, and no -ZLV after step 2.

CAPCOM That's affirm on that, and I think Vance your read back was good also. We want to do COAS and startracker again this pass, and then deactivate rel nav after sunset.

SPACECRAFT Roger, copy.

SPACECRAFT Houston, this is Challenger, radio check over.

CAPCOM Roger, Bruce, we've got you loud and clear.

SPACECRAFT Jerry, how do you read? Jerry, how do you read my transmission at this time.

CAPCOM Okay, a little bit broken right at first, but you came clear.

SPACECRAFT Thank you.

CAPCOM Challenger, Houston. Hoot we're wondering where you are at with the mass spec activities.

SPACECRAFT Jerry I'm working the mass spec activity and just beginning, just completed the activation, starting step 1 of the mass spec, at the very beginning.

CAPCOM Okay, copy that, Ron, and we would like you to change the PCMMU formats to 179 and 116, please.

SPACECRAFT Roger, 179 and 116.

CAPCOM Challenger, Houston, we're 30 seconds to LOS Hawaii, be back on TDRS in a minute or so, and a reminder we will be using your cameras in the bay on that pass for the first 15 minutes.

SPACECRAFT Okay, Jerry, we'll see you then.

CAPCOM Challenger, Houston, through TDRS.

SPACECRAFT Roger, Houston, loud and clear. Houston,
CAPCOM        Go ahead, Challenger.

SPACECRAFT   Yeah, Jerry, Ron had just come up to step 2 on the
mess spec, and that requires -XLV Y pop payload bay forward, I
understand you want us to stay off of all the maneuvers until the
end of this daylight pass?

CAPCOM        Okay Hoot, stand by, I think we're in a good
position, but stand by a minute.

SPACECRAFT   Okay, the other course might be that you want us to
go ahead and do the calibration in this present attitude?

CAPCOM        Challenger, Houston, for Hoot. Hooter, we don't
need to do any maneuvers, we can stay in this attitude for the
calibration.

SPACECRAFT   Okay, sounds good, Jerry, I guess that winds up
plus XLV essentially wide pop payload bay forward, so that should
be almost the same.

CAPCOM        Okay. Challenger, Houston, for your information
we're getting some nice views from the cargo bay camera of the
world passing by. And also for Ron we'd like you to go ahead and
activate the MOM's when you get a chance, so that we can have it
powered up and ready to go for the next data take.

SPACECRAFT   Okay, waiting for the mass to warm up, I'll go
ahead and activate the MOMS at this time.

CAPCOM        Okay, Ron, thank you.

SPACECRAFT   Okay, the MOMS is powered.

CAPCOM        Roger that, thank you.

SPACECRAFT   Houston, Challenger, mass spec program -
calibration program loaded at 3 + 36, over.

CAPCOM        Copy Ron, thank you.

END OF TAPE
CAPCOM  Copy, Ron, thank you.

PAO  This is Mission Control 2 days 3 hours 38 minutes, we've been getting downlink television from the spacecraft through the Orbiter's payload bay cameras, and the cameras on the RMS. Orbiter now passing down over Central America. Looking at the Ku-band antenna. This is Mission Control Houston at 2 days, 3 hours, 51 minutes, mission elapsed time. Challenger out over South America at the present time, on orbit number 35. During that press conference we had some television downlink from the spacecraft of earth views and the RMS checkout we'll be replaying that here shortly here at 11:00 a.m. central time, so everyone can see that. There was some very nice television from those onboad cameras. Crew continues to do some work with - using the crew optical alignment system and the startrackers to gather the sighting data on the integrated rendezvous target. And the planning for the remainder of the flight is falling into place as the payload people have selected to deploy the Palapa Indonesian commumciations satellite, on the descending equatorial crossing of orbit number 50 at 9:13 a.m. central time tomorrow. So we should be putting all of the other activities in their appropriate places in the timeline and messages to uplink all the details to that to the crew are being prepared at the present time here in Mission Control. Most of the crew's activities today will revolve around the SPAS the Shuttle pallet satellite. It's activation and the operation of some of the experiments onboard that system. The SPAS is carrying the same set of experiments that were flown aboard shuttle flight 7 back in June of last year. That was the SPAS-01, this - on this flight is referred to as the SPAS-01A. In addition to those experiments on the SPAS, some material processing experiments, and the yaw sensor, the frame work is carrying a 70 millimeter, hasselblad still camera, 16 millimeter motion picture camera and 2 color television cameras. Later in the flight, during one of the EVA's the SPAS will be used as a simulated solar maximum satellite. The crew-members, Bruce McCandless, and Bob Stewart will be flying up to the SPAS as it is held and slowly rotated by the mechanical arm at a rate of approximately 1 degree per second, which duplicates the rate of roll of the solar maximum satellite, and this will give them practice opportunity at latching onto the grapple fixture of that satellite. As they would with the solar maximum satellite. The crew is also going to be activating group A of the get away special canisters. We'll be working some with the animal closure module, and we'll be setting up the cinema 360 camera for some of its observation. They will also be doing some temperature and health checks of the Palapa satellite's equipment, making sure all is well with that setup before its deploy takes place tomorrow morning. The Challenger and the remains of the integrated rendezvous target have been drifting slowly over the last few --

END OF TAPE
They will also be doing some temperature and health checks of the Palapa satellite's equipment, making sure that all is well with that setup before its deploy takes place tomorrow morning. The Challenger and the remnants of the Integrated Rendezvous Target have been drifting slowly apart over the last few hours, and they are now about 200,000 feet apart, about 30 nautical miles distance. And we are still taking some sightings from that with the crew optical alignment equipment. We should be picking up in about 3 or 4 minutes on our replay of the television that was recorded a little bit earlier, of the Earth views and the checkout of the Remote Manipulator System.

Challenger is within range of the Tracking Data Relay Satellite on orbit #35, passing out over the Atlantic Ocean presently. We're at 2 days, 3 hours, 57 minutes into the flight, this is Mission Control Houston.

Challenger, Houston for Vance or Bruce.

Go ahead, Houston, he's listening.

Ok, we see on the ground that your attempting to do COAS marks, our recommendation is if you can't see it adequately to get marks on COAS to press on to the startracker.

Yes, Jerry, Vance is going to go ahead and take a look at it and we'll go ahead go to startracker if he has trouble with it, but I think he can see it pretty clearly.

Ok, copy that, thank you. Challenger, Houston, for Bob.

Go ahead, Jerry.

Ok, Bob, just in case you're looking at doing some ASE temp checks. We would like to delay those, we anticipate doing a modified spacecraft health check at Hawaii and we'll be giving you further on that later.

Ok, the temps are already on their way down to you so you might as well look at them now.

Ok, I'll tell payloads it's already coming.

Houston, Challenger.

Go ahead, Challenger.

(garble) I could just barely see them through the COAS, the IRT that is, (garble) getting a mark, so pretty good recommendation (garble) of the center.
CAPCOM     Ok, I didn't copy all that, Vance, I copied you could not get COAS marks, it was too faint, you took startracker, and I didn't copy the last part.

SPACECRAFT  (Garble) startracker is not picking them up, apparently it's too faint for the startracker, I don't see a star presence on SPEC 22, although the ILC is within 1 degree of the center of the COAS. So I may go back, and well it's whatever you recommend, wait to see if it gets brighter approaching the terminator and the startracker will pick him up, or go back and try COAS marks.

CAPCOM     Ok Vance, we're kind of scratching our heads, it's kind of hard to understand how you can see it and the trackers can't. Stand by, we're trying to get a recommendation.

SPACECRAFT  Well, we got him now.

CAPCOM     Roger, copy, thank you. Challenger, Houston, for Ron and Hoot.

SPACECRAFT  Ok, Jerry.

CAPCOM     Ok, as soon as you've completed the mass spec portion of the SPAS activity, we would like you to go ahead and use norm Bl DAP to manuever to attitude for the yaw sensor work. And we'll consider it satisfactory if you can get at least 1/2 of one of those yaw sensor manuevers in.

SPACECRAFT  Ok, Jerry, we copy that and we'll move into it as soon as the mass spec is finished.

CAPCOM     Roger that. And for Bob. Bob, I'll have some information for you on the health check at Guam in preparation for Hawaii.

SPACECRAFT  Ok Jerry, sounds fine. Ok and Jerry, that was DAP Bl on the normal jets to get to attitude, right?

CAPCOM     That's affirm, Hoot, and then you can go ahead and use what the callout has in the procedure.

SPACECRAFT  Ok, sounds good.

END OF TAPE
CAPCOM - in the procedure.

SPACECRAFT Okay, sounds good.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Vance.

SPACECRAFT Okay, we're approaching 40 marks, once again as we get close to the terminator, it's fairly easy to see the target in the COAS.

CAPCOM Roger copy that, are you also seeing some of those other boggies out there?

SPACECRAFT We've been talking about it, I think I see one other, he's much fainter, only questioned in my mind is could he be a star, or is it some paraflex affect through the window or something.

CAPCOM Okay, copy that, and we're about 4 1/2 minutes till LOS here, Guam is next at 04+37.

SPACECRAFT Copy. Copy terminating rendezvous nav per your earlier instruction after the - we're about to complete step 3 just a moment, Jerry.

CAPCOM Okay, copy that, and that's a roger for Vance, on terminating rel nav after this pass.

SPACECRAFT (garble)

PAO This is Mission Control Houston at 2 days 4 hours 16 minutes, mission elapsed time. The Orbiter Challenger has passed beyond the range of the tracking data relay satellite and we'll be out of communication for about 20 minutes here, until we reacquire over the Guam station. As we were talking to the crew before they, just a few minutes before the LOS period as they passed from daylight into darkness, they were working with the startracker, using that to sight in on the remnants of the integrated rendezvous target, and still getting sightings on that at a distance of, greater than 200,000 feet. They were not having much success in sighting in on it with the crew optical alignment system as it was getting fairly faint at that range. The time line activities are now being updated, now the deploy time for the Palapa has been selected. That deploy time is orbit number 50, for the satellite to be deployed from the Orbiter cargo bay, as the ground track takes it across the equator, 1/2 way through orbit number 50. That would occur at 9:13 a.m. central standard time tomorrow. Just to review, today was to be a day of rendezvous activities with the integrated rendezvous target, designed as a 2 meter in diameter mylar balloon, a flat
white color. That was ejected from the shuttle early this morning with the intent that it then precede away from the shuttle and inflate. There was some difficulty there, the balloon did not successfully separate from it's container, and attempted to inflate within the container, a portion of it extended beyond the ends of the box that it was in, and than it apparently burst as the crew noted, while they were observing it. That left fragments of the fabric along with miscellaneous other pieces, the staves, or the sides of the containers, along with the 200 lb mass that was a part of the integrated rendezvous target, the crew and the ground did work with those remaining fragments to accomplish some of the objectives of the rendezvous and they did, did use the crew optical alignment system and the startrackers as well as the rendezvous radar in practicing some of there activities. However, it was decided not to move back in at close proximity with the target as the exact location of the 200 lb mass was not certain and it was decided to be conservative and not take the chance of running into that 200 lb mass. So for the last 2 or 3 orbits the crew has been observing --

END OF TAPE
PAO --- the exact location of the 200 lb mass was not certain and it was decided to be conservative and not take the chance of running into that 200 lb mass. So for the last 2 or 3 orbits the crew has been observing the large piece of mylar remaining of the integrated rendezvous target and taking sightings off of that as it slowly drifts away from the Orbiter. The last sighting here during this last TDRS pass was at a range of something greater than 30 nautical miles. We're still about 16-1/2 minutes away from renewing contact with the crew over the Guam station at 2 days, 4 hours, 20 minutes Mission Elapsed Time, this is Mission Control Houston.

CAPCOM Challenger, Houston with you UHF only, Guam for 7 minutes.

SPACECRAFT Jerry, we got you loud and clear.

CAPCOM Copy that. We were just wondering how the yaw sensor work is coming.

SPACECRAFT (garble) that's attitude 11 of the plus yaw maneuver.

CAPCOM Ok, copy that.

SPACECRAFT Jerry, we're ready to copy that health check and thermal check data if you like.

CAPCOM Ok Bob. We'll give you further information here before we end as to exactly where we want to do it, but here goes. We want to put input 1 to decom 2, input 0 to decom 4, we want PPM #1 and we need a TFL of 178/101. We don't want to go to that however, until the yaw sensor work is done. And let me read you thru the procedures here, Bob, you ready?

SPACECRAFT Yes, go ahead Jerry.

CAPCOM Ok, our concern is for the Palapa batteries, therefore we want to do a modified ASE temp check using the spacecraft health check on page 4-22 of the PAM Deploy checklist except we will delete the contingency sunshield opening on 4-16, the reference to 4-16, and also at the completion of the health check, we will replace a contingency sunshield closing, referenced on 4-18 with an SCA power down. Also we would like you to not swap SCA until we give you, I mean ASE, until we give you a go. And also we will give you a go for termination. Over.

SPACECRAFT Ok Jerry, (garble) read this back to you. From the check you want input 1 in decom 2, input 0 in decom 4, first part of the memory #1, TFL's are 178/101, we're to go there after the (garble) working or after the SPAS work is done - yaw sensor. We're going to do a modified ASE temp check using the health
check on pg 4-22, we'll delete the sunshield opening and we'll replace the sunshield close with (garble) powerdown. Wait on your go for swap ASC and for termination.

CAPCOM      That's a good readback, Bob.

SPACECRAFT Jerry, when you're ready, I've got some information on teleprinter message 19-A regarding your questions on the WCS fan separator.

CAPCOM      Ok, there's no rush on it, Bruce, I guess we'd rather wait untill we get on to TDRS, if that's ok with you.

SPACECRAFT Roger, I understand you don't want it this pass?

CAPCOM      Roger, we'd rather delay until TDRS.

SPACECRAFT Ok. Houston, Challenger, a question on the yaw sensor.

CAPCOM      Go ahead, Hoot.

SPACECRAFT Yes, Jerry, we're just about done with the +yaw. Do you want us to go ahead and press on in to the -yaw side of it?

CAPCOM      Stand by, that's a negative, Hoot. It looks like you're coming up on sunrise, it doesn't look like you'd be able to finish the - -

END OF TAPE
CAPCOM   Go ahead Hoot.

SPACECRAFT   Yes. Jerry, we're just about done with the plus yaw. Do you want us to go ahead and press on into the minus yaw side of it?

CAPCOM   Standby. That's a negative Hoot. It looks like your coming up on sunrise. It doesn't look like you'd be able to finish the second half set there. No, we'd like you to go ahead and terminate that portion of the yaw sensor work. And Bob can go ahead and configure for the spacecraft health checks. We'll try doing those at Hawaii.

SPACECRAFT   Okay Jerry, we copy.

SPACECRAFT   Jerry we copy and how much time do we got till Hawaii. I'm downstairs on the treadmill now?

CAPCOM   Say again please.

SPACECRAFT   How much time do we have before Hawaii?

CAPCOM   About 9 minutes.

SPACECRAFT   Okay, thank you.

CAPCOM   Challenger, Houston for Bob.

SPACECRAFT   Go ahead Jerry. We'll pass it to him.

CAPCOM   Okay, just one clarification. He does need to do 4-16 in the PAM book, to power up the SCAs and enable them. We do not want the sunshields open. That is the part we do not want to have performed, over.

SPACECRAFT   Okay, we copy that. 4-16 in the PAM book. Do not want the sunshields open.

CAPCOM   Roger that Hooter and we're 25 seconds LOS. Hawaii is next in 7 minutes.

SPACECRAFT   Jerry, do you want us to turn the yaw sensor off or leave it on.

CAPCOM   Standby. And Challenger, Houston. Ron you can go ahead and turn off the yaw sensor.

PAO   And this is Mission Control Houston at 2 days, 4 hours, 45 minutes mission elapsed time. The Challenger has passed out of range of the Guam station on orbit number 36, and we have about 5 1/2 minutes before we pick up again over Hawaii. The crew was discussing the operation of the yaw sensor,
one of the experiment packages, mounted on the shuttle pallet satellite in the cargo bay. And astronaut Bruce McCandless had response ready for some questions at the ground set up on the teleprinter relating to the failure of fan separator number 1 on the waste containment system. And they'll be talking about those after we get acquisition through the tracking data relay satellite. But our next communication will be through the Hawaii station in about 4 1/2 minutes. This is Mission Control Houston.

CAPCOM       Challenger, Houston with you at Hawaii for 7 minutes. Standing by for the spacecraft health check.

SPACECRAFT  Just a second Bob, we'll be on line.


SPACECRAFT  Okay Jerry, I understand your looking for the health check.

CAPCOM       Roger, we're standing by.

CAPCOM       And Challenger, Houston. For your information, we've sent you a message which updates the activities for the rest of the day. Message 20 charlie, correction 21.

CAPCOM       I'm sorry.

SPACECRAFT  Okay, we'll look for that.

CAPCOM       I'm sorry it's both 20 charlie and 21. 21 is a weather update.

SPACECRAFT  We copy.

SPACECRAFT  Okay Jerry. Things look good onboard here. I've got a talkback when I turned the ASE on. Showed spacecraft space. ASE1 is on and (garble) are on.

CAPCOM       Okay, copy all that Bob. The guys are looking at it. Is Hooter on the loop?

SPACECRAFT  Down on the treadmill.

CAPCOM       Okay, we'll catch him later. Challenger, Houston for Bob. We still show an active input into D-com 4. We'd like to zero that out.

SPACECRAFT  (garble) - Jerry did you want me to enable STA on D-com 2?

CAPCOM       That's affirm Bob.
STC-41-B AIR/GROUND TRANSCRIPT t120j 036:17:55 2/5/84 PAGE 1

CAPCOM That's affirm, Bob.

CAPCOM Challenger, Houston. We're having some problems getting data into the building. We want to continue this configuration, Bob, for the Spacecraft health check across to TDRS. Also for Vance's information, be advised we're anticipating doing additional startracker work post high noon today on this rev.

SPACECRAFT Oh, okay. Real fine. We'll see if we can pick it up again.

SPACECRAFT And I copy your configuration, Jerry. I'll wait for your go to change ASC 2.

CAPCOM Okay Bob and for Vance, we're sending you a new covariance and once we get back on TDRS I'll give you some additional procedures. And we're 15 seconds LOS. Two minutes to TDRS.

SPACECRAFT Okay.

PAO This is Mission Control. 2 days, 4 hours and 59 minutes mission elapsed time. Challenger is in a brief gap in communication between the Hawaii station and the range of the tracking data relay satellite and the crew is preparing to do a health check on the Palapa airborne support equipment and the other associated gear. We should be picking up through the tracking data relay satellite in about 15 seconds or so on orbit number 36. This is Mission Control.

CAPCOM Challenger, Houston, back with you through TDRS.

SPACECRAFT Okay, Jerry. You're loud and clear.

CAPCOM Challenger, Houston. Bob, for your information we did shut down the Ku when you started the power up of the spacecraft and we'll leave it that way until after you've got it turned back down.

SPACECRAFT Okay.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Vance.

SPACECRAFT Jerry, if it sounds all right to you I'll start maneuvering back to the target tracking attitude so I'll be there by orbital noon.
CAPCOM       Okay, we have no problems with that Vance and also, you'll have to re-enable rendezvous nav, spec 33, item 1. We also would like you to select up the prop state vector and the criteria will be the same once the position correction is less than 1 and you've got 9 marks into the filter. Then you're, after you've got 9 marks then you're go to take them into the filter.

SPACECRAFT  Roger.

CAPCOM       And also Vance, you can go ahead and select the filter (garble) at that time.

SPACECRAFT  You mean select rendezvous nav now?

CAPCOM       Rog, Vance. You can go ahead and select rendezvous nav now if you'd like - spec 33, item 1.

CAPCOM       Challenger, Houston for Bob. We're ready to switch over to ASE 2.

SPACECRAFT  Houston, Challenger. GAS group A has been activated.

CAPCOM       Roger, copy group A GAS is activated.

CAPCOM       Challenger, Houston for Ron.

SPACECRAFT  Jerry.

CAPCOM       Roger, Ron. Do you have a time for activation please.

SPACECRAFT  That's affirmative. 5 plus 04. GAS group A at 5 plus 04.

CAPCOM       Copy that and Bob did you call, did you get our call to go over to ASE 2? We had a comm drop.

SPACECRAFT  Negative, Jerry. That's the first time I've had it. Going to ASE 2 now.

CAPCOM       Challenger, Houston for Vance. We'd like to confirm that you do have a target ID of 1 and a body vector of 3 set into the software.

SPACECRAFT  Well, stand by. Okay, Jerry. Stand by.

END OF TAPE
STS-41B AIR/GROUND TRANSCRIPT
VOL. TWO
NET 2 DAYS, 5 HOURS THROUGH 4 DAYS, 3 HOURS

NASA Johnson Space Center
Public Affairs Office
Houston, TX

MAR 8 1984
PAO This is Mission Control Houston at 2 days, 5 hours, 10 minutes mission elapsed time. A few minutes ago the crew reported that they have activated group A of the getaway specials. The items included in that group are the 3 getaway special payloads G051 which is from GTE laboratories to study modified optical and electrical properties of arc discharge lamps when the convective effects that you encounter in gravity are eliminated. This experiment runs on 3 different occasions. Getaway special G309 is provided by the U. S. Air Force. It will investigate the probably and incidence of cosmic ray induced errors in memory type integrated circuits when flown in a shuttle orbit. And getaway special payload G349 is from the Goddard Space Flight Center. Another one of the NASA centers and the purpose of this one is to monitor the effects of atomic oxygen erosion on materials. This is similar to an experiment flown on Shuttle Flight 8 in August. There are 7 groups of getaway special activations. Some are repeats of the ones we've talked about earlier. There are a total of 5 getaway specials on this flight.

CAPCOM Challenger, Houston. Recommending you go to norms to get your attitude.

SPACECRAFT Okay, bravo norm?

CAPCOM We think so, Vance. We're not sure what your B DAF is set up for right now.

CAPCOM Challenger, Houston for Bob.

SPACECRAFT Go, Jerry.

CAPCOM Okay, Bobby. All the data looks good down here. We're still pressing for a 50 D deploy tomorrow. You'll go to terminate the test and to power down the ASE and SCAs and also we would like you to perform configuration 124 in the orbit ops flight sup 1-3 to get back to the right PCMMU configuration and decomps.

SPACECRAFT That's configuration 124 on flight sup 1-3.

CAPCOM That's affirm.

CAPCOM Challenger, Houston for Bob. We have one switch for you.

SPACECRAFT Go ahead, Jerry.

CAPCOM Okay Bob. It appears to us that we don't have the SCA enable switch to off yet.
SPACECRAFT    Okay and thanks for watching Jerry. I've done so many thermal checks I just went over and did it, just read the book.

CAPCOM       No sweat, Bob. We've been chasing you guys around the mulberry bush today. Thanks for all your good work.

SPACECRAFT   Okay, Jerry. Looks like we, we're acquiring IRT okay. I've got 4 marks so far.

CAPCOM       Roger, Vance. Copy that and when you get 9 marks and your position is less than 1 you're go to select filter and also we're wondering if you can see visually with the COAS the target.

SPACECRAFT   As soon as we get the 9 marks in I'll give you a call on that.

CAPCOM       Okay. Copy that. And once again after you go sunset this rev, you're go for block 27, page 3-21 which disables rendezvous nav again.

SPACECRAFT   Roger. Sure you won't want to try it again on the next rev. I mean, if you would I can leave it up.

CAPCOM       I took them to the MAD. Let me ask them one last time here. Everybody will be happy, Vance, if we get this one last pass here.

SPACECRAFT   Okay. Well it's no problem for us.

CAPCOM       Copy that.

PAO          This is Mission Control 2 days, 5 hours, 21 minutes. That last conversation with Commander Vance Brand speaking of --

CAPCOM       Challenger, Houston for Bruce.

SPACECRAFT   Go ahead, Jerry.

CAPCOM       Okay, Bruce. Mary's going to take over the helm here and she'd like to hear all your good words about the WCS.

END OF TAPE
STSW 41-B AIR/GROUND TRANSCRIPT t122j 036:18:21 2/5/84 PAGE 1

CAPCOM Challenger, Houston for Bruce.

SPACECRAFT Ok, Jerry.

CAPCOM Ok, Bruce, Mary's going to take over the helm here and she'd like to hear all your good words about the WCS.

SPACECRAFT Ok, I'm looking for the - I'll be with her in just a second.

PAO Crew has acquired the IRT with the startrackers at a range of 55 nautical miles. And after this sunset in space there, they will cease the rendezvous activities and disable the rendezvous radar.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Mary.

CAPCOM Roger, Vance, just wanted to let you know we're uplinking a state vector to you now; a new one, and you are go to go to a -ZLV attitude, nose first, and you can set up you DAP sep in the nominal Al Bl.

SPACECRAFT Ok, will do. And advise near the end of the pass, Bruce could see the targets.

CAPCOM Ok, thanks, we copy, good news.

SPACECRAFT Correction, Bruce had him for about 10 or 15 minutes in the COAS.

CAPCOM Roger, we copy, Bruce had a visual fix 10 to 15 minutes. Challenger, Houston, we're 30 seconds LOS off TDRS. We'll talk to you again through Guam at 6:14.

SPACECRAFT Roger, Houston.

PAO This is Mission Control Houston at 2 days, 5 hours, 53 minutes. We have Loss of Signal with the Challenger through the Tracking Data Relay Satellite, crew in that recent pass has been working on the acquisition with the startracker and the Crew Optical Alignment Sight of the remnants of the IRT. We'll pick up again in about 21 minutes. This is Mission Control.

CAPCOM Challenger, Houston with you through Guam for 4 minutes.

SPACECRAFT Roger, Mary, we've got you through Guam.

CAPCOM You're loud and clear. Challenger, Houston.
Go ahead, Houston.

Roger, we'd like to request PDI Decom 4 and FDA enabled.

Ok, Mary, couldn't quite understand that, say again please.

Requesting PDI Decom 4 and FDA enabled.

Ok, understand you want FDA on Decom #4 enabled.

That's affirmative.

Ok Mary, you should have that.

Thanks. Also have one note for you on the left OMS to RCS interconnect when you're ready to copy, it's just a presleep configuration.

Ok, Mary, ready to copy.

Roger, we would like you to continue with the left
CAPCOM    Thanks. Also have 1 note for you on the left OMS to RCS interconnect when you're ready to copy. It's just presleep configuration.

SPACECRAFT  Okay, Mary. Ready to copy.

CAPCOM    Roger. We would like you to continue with the left OMS to RCS interconnect through the sleep period tonight. In other words, don't perform the interconnect return during your presleep activity. We'll give you a call tomorrow and tell you when to terminate your interconnect, over.

SPACECRAFT  Okay Mary, we copy that. We'll leave the interconnect going to the RCS from the left OMS.

CAPCOM    That's affirm.

CAPCOM    Challenger, Houston. We're about 40 seconds LOS. We'll talk to you through Hawaii at 6 plus 26.

SPACECRAFT  Okay, Mary. We'll see you there.

SPACECRAFT  And Mary. We got the mass spec deactivated. I'll get you a time at Hawaii if you want one.

CAPCOM    Roger, copy. That's affirmative. We want one and we'll be standing by at Hawaii.

PAO      This is Mission Control Houston at 2 days, 6 hours, 26 minutes. Standing by for acquisition through the Hawaii station.

CAPCOM    Challenger, Houston with you through Hawaii for 7 minutes.

SPACECRAFT  Okay, Mary. You're loud and clear at Hawaii.

CAPCOM    You're loud and clear too and we're standing by for that time.

SPACECRAFT  And Mary, tell us one more time what time it is you're waiting to hear.

CAPCOM    Roger. It was a mass spec time we're standing by for at Hawaii here.

SPACECRAFT  Okay. Ron is running the 360 right now. Let me see if I can find it.

CAPCOM    That's --

SPACECRAFT  That mass spec time was 6 plus 05.
CAPCOM Thanks a lot. We copy 6 plus 05. We have another action on that mass spec when you're ready to copy. They'd like to check something.

SPACECRAFT Okay, go ahead, Mary.

CAPCOM Roger. The guys down here on the ground have not seen the mass spec swivel through telemetry and they'd like to confirm that it is swiveling. So they'd like you to turn the mass spec power on. Do an item 8 plus 5 waiting 2 minutes to make sure that the shield has swiveled and we'd like you to verify that visually if you could to check it against our telemetry and then power the mass spec back off again, over.

SPACECRAFT Okay. Mary, out the window we have seen the shield move but we'll be happy to go through that. You want us to do a item 8 plus 5.

CAPCOM That's firm. That's good news you've seen the shield swivel but they'd like to check the ground telemetry.

SPACECRAFT Okay, yes that's great, Mary. We'll go ahead and do that then.

CAPCOM Okay, thanks.

CAPCOM Challenger, Houston. Also have a question on the TV that you covered the IRT deployment with— whenever you're ready to talk about it.

SPACECRAFT Mary, how about if we catch you on the next pass on that one or through TDRS. Ron is running the camera right now.

CAPCOM Okay. That's fine and then only have one more thing for you. It's an action on panel A7 when you're ready to copy.

SPACECRAFT Okay, ready to copy.

CAPCOM We'd like you to take the downlink switch to enable and that's because when we get on TDRS we're going to use camera A to take some views of the bay.

SPACECRAFT Okay. We put the downlink to enable on the TV.

CAPCOM Okay, thanks. That's all we got for you.

SPACECRAFT Okay and, Mary, you ready to watch the mass spec for me to go ahead and turn it on and then give you an 8 plus 5.

CAPCOM That's firm. We're standing by and ready to watch the data.
PAO This is Mission Control at 2 days, 6 hours, 33 minutes mission elapsed time. Challenger still within range of the Hawaii station and we'll have a brief gap in communications until we pick up again with the --

END OF TAPE
CAPCOM That's affirm, we're standing by and ready to watch data.

PAO This is Mission Control at 2 days, 6 hours, 33 minutes, mission elapsed time. The Challenger is still within range of the Hawaii station and then we'll have a brief gap in communication until we pick up again with the tracking data relay satellite. At that time the cameras in the payload bay will be used to observe the canister from which the integrated rendezvous target was ejected at the start of today's activities. Of course, that target had difficulty in its deployment and its setup did not function well and as a result only a limited amount of the rendezvous or tracking activities that were planned with that piece of equipment were able to be conducted. Flight Controllers here in Mission Control would like to observe that canister to see if there are any other remains of the wires or the lanyards.

CAPCOM Challenger Houston, we're about 50 seconds LOS, we're going to drop you for a minute, and then pick you up through TDRS.

SPACECRAFT See you in a couple of minutes.

PAO To see if any other remnants of the wires or lanyards which assisted in that deploy and activated the timers for the pyrotechnics on the box that the IRT was contained in. Have, if any of those have remained behind, and if that contributed to the failure of the IRT. We'll pick up again in about a minute through the tracking data relay satellite. 2 Jays, 6 hours, 35 minutes, this is Mission Control Houston.

CAPCOM Challenger, Houston, back with you through TDRS for about 50 minutes.

SPACECRAFT Okay.

SPACECRAFT Houston, Challenger, did your data look good on the mass spec and program (garble)?

CAPCOM Challenger, Houston, we were just discussing that, it looks to us like the swivel moved to the Z but not back to the X as it should have. And did you visually verify or could you visually verify that it did move back to the X position.

SPACECRAFT Okay, Mary, what I thought I'd do when we first brought it up, was it gave us a code of echo delta, which of course puts it into 2, and then I went to fox 9 from there and then I saw it go to fox 7 and then back to fox 5, and I did see it swivel from the −Z up to the −X, but it didn't stay at −X, it just got up to there, and then went right back to the −Z.
CAPCOM       Copy that, thanks.

SPACECRAFT   I'm hoping it wasn't suppose to stay at -X, just go up there, take a look, and go back.

CAPCOM       Roger, Hoot, that seems to be what it was suppose to do, they're checking on that, they're happy enough with it, you can go ahead and power the mass spec off and then you can power the MOMS off also.

SPACECRAFT   Okay, I understand, you want those right now, the mass spec and MOMS both off?

CAPCOM       That's affirm.

SPACECRAFT   Okay, there they go.

PAO          We're looking at a picture of the canister in which the integrated rendezvous target assembly was ejected. And we can see 2 of the lanyards and the pins which are suppose to remain there and when the item is ejected, those pins are then pulled from the pyrotechnics which activates timers and several seconds after leaving the shuttle cargo bay, the two sides then would split apart, allowing the balloon to inflate. That split apparently didn't occur and resulted in the integrated rendezvous target attempting to inflate and then erupting.

SPACECRAFT   Houston, Challenger.

CAPCOM       Challenger, Houston,

SPACECRAFT   Okay Mary, we just finished off that first magazine on cinema 360, we got some really good scenes, I think, some of them (garble). (garble) will be pretty pleased with it. I wanted to talk to you about the IRT television.

CAPCOM       Roger, Ron, we wanted to ask about whether you thought we should try to recover any of that TV through a dump that might help the guys down here reconstruct what happened. That would be any TV just post deploy, over.

SPACECRAFT   No, Mary

END OF TAPE
CAPCOM       Roger, Ron, we wanted to ask about whether you thought we should try to recover any of that TV through a dump that might help the guys down here reconstruct what happened. That would be any TV just post deploy?

SPACECRAFT   No, Mary, I don't think there is any TV that's going to help. We had the, we had camera D looking at it, as you know camera D cannot tilt. Camera B never came up at the time with any appreciable video of any quality. For some reason, usually all of the automatic and manual controls, we could not get a good picture coming up on B, anyway I took camrea B and pointed it above the bulk ahead anyway to try to capture the IRT as it left the payload bay, and never picked it up. We picked up objects which probably was flying debris, which may have looked like it was the IRT, but we did not pick up the IRT until the blanket had separated from the main structure, from the primary structure, and we tracked it across the sky at that point, you want to look at that, I think we had some of that real time, but that's about all we have of the TV. We really did not get anything of any significance and I doubt if it will be of much use to you.

CAPCOM       Roger, Ron, we understand.

SPACECRAFT   We got on 16 millimeter though, Mary, the explosions so you're going to have to just see that when we get back.

CAPCOM       Copy that thanks.

SPACECRAFT   It was quite violent too.

CAPCOM       Roger, copy.

SPACECRAFT   Yeah Bob I was running 16 millimeter, you've got about 7 minutes of that right out the bay, so that should be of use.

CAPCOM       Roger, we're looking forward to seeing that thanks.

SPACECRAFT   We were looking forward to seeing the balloon.

CAPCOM       Roger that.

SPACECRAFT   And we've got the AEN video complete also.

CAPCOM       Copy.

PAO          This is Mission Control, we've been looking at the lanyards and attached pins from the deployed canister, the intergrated rendezvous target, trying to gather some data on
relative to the failure of the proper inflation of the integrated rendezvous target balloon earlier this morning. Now we are looking along the port loner, the camera on that side, looking there in the foreground, the large item there right in the center, the top center is the shoulder joint for the remote manipulator system, and we're looking down the length of the 50 foot arm, which is now going off to the left of the picture. See the port slide wire. And the Orbiter port wing off to the side. These views of the earth from the Orbiter's forward port side --

CAPCOM       Challenger, Houston.

SPACERRAFT   Go ahead, Mary.

CAPCOM       Roger, you're go to deactivate the SPA's per the checklist, then have one more note for you.

SPACERRAFT   Okay, go to deactivate the SPA's and one more note, go ahead.

CAPCOM       Roger, about your cabin press maintenance, we'd like you to reset your cabin pressure, lower limit, so you don't get any alarms tonight. We'll do the software, but you can do the hardware reset, that's channel number 4, for the cabin pressure. We'd like that lower limit at 3.4 volts dc.

SPACERRAFT   Copy 3.4 volts dc, on channel number 4.

CAPCOM       That's good readback.

PAO          Challenger passing, crossing the coast of South America at the present time, on orbit 37. Crew given the go ahead to deactivate the shuttle pallet satellite, it's experiments we're running today. And then they were given a note about managing the cabin atmosphere, which will be allowed to gradually reduce in pressure through normal usage till the cabin is down to about the 10.2 psi, to allow a long prebreath period, take the nitrogen --

END OF TAPE
PAO --- the cabin atmosphere which will be allowed to gradually reduce in pressure through normal usage till the cabin is down to about the 10.2 psi to allow a long prebreath period, take the nitrogen out of the blood of the crew so that those that are going on the space walk will have a shorter prebreath time before they get into the very reduced pressure in the spacesuits. And these pictures here as the Orbiter crosses the coast of South America.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Yes, Mary, let me elaborate a bit on where we stand with the Cinema 360. To date we have let off a total of 1 magazine. We did not run the second magazine. We got some good scenes on the first magazines of (garble) duration. We did get in the treadmill scene, we got in some dining in 0-g, we got a scene of acrobatics, and we have a scene of the air-lock door opening and the EVA crewman starting their EMU checkout, all on one mag. We elected to, rather than start another magazine and take footage of questionable quality, we elected to use the one magazine we have, configure for the Palapa deploy tomorrow, and then start with the new fresh magazine taking shopping list scenes. We could have started the 2nd magazine, but we would've gotten half-way through or all the way through with sub-par scenes. Over.

SPACECRAFT We understand and concur with that, and you're ahead of us. The suggestion that was made about getting a 50 D deploy on the Palapa earlier to you by Jerry, is now official and we got a note from the Palapa folks, and we are going to attempt a 50 D deploy tomorrow.

SPACECRAFT Ok, good, sure glad to hear that.

CAPCOM So were we.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston.

SPACECRAFT Go ahead, Houston.

CAPCOM Roger, we're about 40 seconds LOS, we'll talk to you again through Hawaii at 8+02, and your alignment data looks good, and you can go ahead and torque anytime you need it.

SPACECRAFT Ok.

PAO This is Mission Control Houston, 2 days, 7 hours, 29 minutes Mission Elapsed Time. Challenger is passing out of
range of the Tracking Data Relay Satellite, just now crossing the
Equator, in a few moments, the start of orbit #38. Planning
activities still going on here in Mission Control and the crew is
in their scheduled presleep activity, they have about an hour and
40 minutes before they are actually due to turn in for the
night. Crew has just maneuvered to IMU align attitude and has
used the startracker to acquire a pair of stars, provide the
basic navigational information to the Orbiter systems to help it
know where the Orbiter is. And items being powered down for the
night, the SPAS has been powered down for the night, and its
associated experiments turned off. Mission Specialist Ron McNair
reported a little bit earlier that they had taken a reel of film
on the cassette, or on the Cinema 360 camera. That's the payload
camera of the 2 Cinema 360's. And they had taken film of the
meal period, exercise, EMU checkout, and acrobatics and other
scenes of crew with that special camera. And now they have set
it up to operate during the Palapa deploy which is going to be on
orbit #50 tomorrow morning about 9:15 in the morning. It'll be
about another 1/2 hour before we - -

END OF TAPE
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PAO

--- Palapa deploy which was going, which is going to be on orbit number 50, tomorrow morning about 9:15 in the morning. It will be about another half hour before we pick up contact again with the Orbiter. That should be over the Hawaii site. At 2 days, 7 hours, 31 minutes, this is Mission Control Houston.

CAPCOM

Challenger, Houston, with you through Hawaii for 7 minutes.

SPACECRAFT

Hello, Houston, this is Challenger, loud and clear.

CAPCOM

Got you loud and clear too. Challenger, Houston, we're about 40 seconds LOS Hawaii and we'll drop you for about 4 minutes, until we pick you up on TDRS, we'd like the startrackers back to the track mode now, and PDI decom for FDA inhibited, over.

SPACECRAFT

Okay, copy.

CAPCOM

Challenger, Houston, with you through TDRS for 47 minutes.

SPACECRAFT

Hello, Houston, we've got you loud and clear.

CAPCOM

You're loud and clear too. Challenger, Houston

SPACECRAFT

Go ahead, Mary.

CAPCOM

Roger, got some questions for the crew about the IRT today, and we're also standing by waiting to hear Bruce's answers to the other questionnaire we sent up.

SPACECRAFT

Okay, Mary, I thought we were waiting for a TDRS pass for that, but I'll dig out the message and get with you in a minute.

CAPCOM

Roger, we've got 44 minutes left in this TDRS pass.

SPACECRAFT

Mary, in the meantime we could probably pass on with the IRT question.

CAPCOM

Okay, the first question, the two lanyards extending from the IRT deploy package, were they connected at the free end, were the ends of the lanyard looped or straight, over.

SPACECRAFT

Mary, they were not connected at the free end, both of them stuck out pretty much, they were parallel to each other, but the two of them in a sense were sticking radially out
in that the plane of the base of the package and they were not connected at the free ends, over.

CAPCOM Copy that, did any debris leave the balloon package area in a radial direction after deployment from the Orbiter?

SPACECRAFT Ah, not, not that we can recall, but I do remember seeing a little strip of mylar, or fill or something like that about 3 or 4 inches long, float up in front of the nose of the spacecraft, maybe 3 or 4 minutes after the deployment.

CAPCOM Copy that, did the stays completely separate and clear the balloon package?

SPACECRAFT No we never saw the stays go ever.

CAPCOM Okay, thanks.

SPACECRAFT But one of our number – the stays, Mary the stays were still on the balloon when it just kind of exploded, after that six or seven minutes, you could see the stays leave then, but it looked like they were broken loose by the inflation of the balloon.

CAPCOM Copy, did that balloon every fully inflate?

SPACECRAFT Maybe I should say attempted inflation of the balloon. It looked like a very violent explosion with it, Mary.

CAPCOM Copy that, so it really never inflated we'll say. So then you couldn't see if it deflated, it just sort of all happened at once, Rog?

SPACECRAFT Yeah, it was just like someone stuck a stick of dynamite in it and blew it up. Stays went off in all directions, and the balloon just (garble) you could see the inside of the balloon, it was shattered.

CAPCOM And do you have any other ideas on that would make us understand that the balloon may have separated from the ballist package, over.

END OF TAPE
SPACECRAFT Yes, it was just like somebody stuck a stick of
dynamite in it and blew it up. Stays went off in all directions
and the balloon just, you could see the inside of the balloon.
It was shattered.

CAPCOM And (garble) is that would make us understand that
the balloon may have separated from the ballast package, over.

SPACECRAFT We've been discussing that and we can't really say
for sure and the view that I got of the separation, Mary, was
through the 16 millimeter camera lens. So that's not, you know I
didn't see it to see a lot of detail but there should be some on
the film.

CAPCOM Okay, thanks. That's the end of the questions and
we appreciate the help.

SPACECRAFT Mary, I looked at the pit of the big piece fairly
extensively through the 14 power general stabilized binoculars
and my conclusion was that there was a piece which represented
about a third of the balloon, like 120 degrees worth around the
equator, pretty much all the gores and then at one end of that
there was another couple of gores joined onto it. Sort of like
it was joined at one of the polar locations and I could see both
the white painted exterior and portions of the black painted
interior of the plastic and although I can't be 100% positive.
I'm 99% sure that the ballast package was not with that piece
which is the piece that we wound up tracking on the radar, over.

CAPCOM Copy that, Bruce. Thanks.

SPACECRAFT I don't think that the curvature in what I saw and
the portions that I couldn't see into were big enough to hide the
ballast package.

CAPCOM Roger, we copy and confirm that that was the piece
the trackers were tracking, right?

SPACECRAFT The piece that we were tracking both with the radar
and with the COAS was the piece that I just described to you. It
looked like, oh, maybe the 120 degree chunk may have been 5 or 6
feet long and then the smaller extension to it may have been
another couple of 3 or 4 feet and it apparently made a pretty
good target as it, you know, moved about and it certainly
reflected the sunlight quite well. I can draw you a sketch of it
when we get back. (Garble) get back.

CAPCOM Roger, thanks, Bruce. Yes, thanks for that
description. It helps explain down here why the guys were seeing
data that made the target appear a little bigger than they
expected.
SPACECRAFT  It, it in fact, may have, you know, in a linear
dimension, been significantly larger than 6 feet but it certainly
didn't have the spherical aspect to it.

CAPCOM  Roger. Copy that.

SPACECRAFT  In fact, when it was rotating the radar at fairly
distant ranges would lose lock and then it would regain lock.
Lose lock, regain lock and so it looks like (garble) not
symmetrical as it was.

CAPCOM  Roger, copy.

SPACECRAFT  Mary, I presume also that given a little bit of
time the people on the ground can take the data that we did get
in tracking it and perhaps any ground based data and figure out
the ballistic coefficient of this thing so you can tell whether
the ballast really was attached or not, over.

CAPCOM  Roger. That's in work. Thanks, Bruce.

SPACECRAFT  Okay Mary. Jerry said this was going to be your
department so here we go on message 19 alpha, over.

CAPCOM  Roger, ready to copy.

SPACECRAFT  Okay. Basically we activated the WCS pretty much
on schedule following insertion. The initial usage, the fan
separator didn't start when the switch was turned to WCS CMU so
it was switched back after a couple of seconds to the off
position and WCS CMU selected again and it started up and seemed
to work okay. There were about 3 usages of the WCS prior to
encountering the failure situation. Now prior to that time I
guess each of the 3 users had been pretty well filled up since
before prelaunch so --
SPACECRAFT -- prior to encountering the failure situation. Now prior to that time, I guess each of the 3 users had been pretty well filled up since before prelaunch so got a fair amount of liquid into it. So far as we know, in each case all the liquid was drained from the cup before the system was shut down but in retrospect, the air flow seemed to be -- that was going to be normal for the onorbit operation of the hardware or not. In the failure situation, it sounded initially like it was running just barely at a very low speed. On the other hand, we have a cabin fan air outlet right over the door to the WCS and again, without being really familiar of what it was going to sound like on orbit, we may have been confusing a little bit of the noise from the air coming out of the cabin fan outlet with the noise from the fan separator. We have no indication that there was any debris in it or that there was any sort of sound that would indicate anything solid or anything like that in it. We were puzzling over it. I guess it wound up being powered on continuously for about 45 seconds or a minute at most when you all called us and said you were seeing stall current and to select fan sep 2. The thought of selecting fan sep number 2 had also occurred to us but we were reluctant to just leap into it since we figured, gee whiz, you know, here we are on the first part of the first day. We can't afford to go using fan separators up at this rate and make it to the end of the mission, over.

CAPCOM Roger, we copy that Bruce. We had a slight cutout in that downlink and if you could say again just the part about the air flow just before failure, over.

SPACECRAFT Okay. On the 3 usages before the failure, it appeared in retrospect the air flow as lower than it is with fan separator number 2. At the time, we felt like we couldn't, we felt like it was acceptable. We couldn't make a really good judgement on whether it was normal or not since we were all wondering whether in zero g and this sort of thing with the acoustics that we had in the cabin here and with the air coming out of the cabin fan vent right over the door to the waste management compartment, whether what we were hearing was normal or not. After going on fan sep number 2, we realized that what we were getting out of number 1 was subnormal but it did work for at least 3 uses and it was on the 4th time that we got the very low speed or the failure to start and you all reported you were seeing the stall current, over.

CAPCOM Roger. So the failure did occur when the fan sep was started up for the 4th time before a 4th usage.

SPACECRAFT Roger, that's correct.

CAPCOM Okay, thanks, Bruce.
SPACECRAFT  Like I say each of the 3 previous uses, it was not really all the way up to par and it probably got a good pint or so out of each one of those since everybody was, you know, from prelaunch.

CAPCOM  Roger, we copy that. Thanks, Bruce. Helps a lot.

SPACECRAFT  And from your indications, Mary, what do you think is wrong with it? It's simply stalled or stuck?

CAPCOM  Well, we have data that those motors were changed out. This unit was flown on STS-8 and the motors have been changed so there has been entry into both the separators. The hypothesis is the fan sep 1 may be flooded. That's what we're trying to ascertain now because if it is, well we may be able to work up a procedure for you to reclaim it.

SPACECRAFT  Sure be willing to give it a try. Hoot, is waiting to try his inflight maintenance procedures here.

CAPCOM  We sure bet he is.

SPACECRAFT  Hoot and Bruce are fighting each other for this job.

CAPCOM  Roger, we copy that. I guess he deserves that. For the Hooter, the Beanie says hi.

SPACECRAFT  Oh, tremendous. Tell the Beanie hi back.

CAPCOM  We'll sure do that.

SPACECRAFT  Mary, if this fan separator 1 problem doesn't get cleared, rather reluctant to stress the system by using the personal hygiene station late in the game.

CAPCOM  We understand and concur with you on that, Vance.

END OF TAPE
SPACECRAFT  Mary, is this PAM separator 1 problem doesn't get cleared, rather reluctant to stress the system by using the personal hygiene station late in the game.

CAPCOM  We understand and concur with you on that, Vance.

PAO  This is Mission Control, the crew has been sharing their observations on apparent failure mode of the IRT, the Intergrated Rendezvous target earlier today, and their notes on the failure of the fans separator number 1 of the waste containment system. The crew has about half hour remaining before they're due to turn in for the night. And virtually all the close out activities for the day have been completed, onboard the Challenger, the spacecraft is on Orbit number 38 out over South America at the present time.

CAPCOM  Challenger, Houston, Vance, on that EMU dump if you're thinking about that, they have, the IFM guy's been busy working over in the lg and then over in the chamber, and they got to workaround procedure for dumping the EMU.

SPACECRAFT  I think that's what Vance was talking about, Mary.

CAPCOM  Challenger, Houston, we dropped lock and say again, your last.

SPACECRAFT  Mary, I think what Vance was referring to was the plan to hook up the personal hygiene station handwasher, near the end of the mission and to give that a try over.

CAPCOM  Roger, Bruce, we understand and I think the feeling here is that, that probably will be held off unless we can recover the first (garble) separator but we were just trying to make you understand that we have a backup also for the EMU dump if necessary.

SPACECRAFT  Okay, we copy, thank you.

CAPCOM  Challenger, Houston.

SPACECRAFT  Go ahead, Mary.

CAPCOM  Roger, Vance, we're going to try to give you an extra 25 minutes of peace and quiet this evening, and sew up our business early if that's okay with you.

SPACECRAFT  Okey doke, that's fine.

CAPCOM  First of all the state vector that you've got is good for 3 more rev's. And we're standing by for a speaker check anytime you want to give us one, and the only open business we've
seen is the LiOH change out left for today. And we have a Westar status if you'd like to listen.

SPACECRAFT Sure would like to listen to that yeah. (garble) let me make sure everybody's on.

CAPCOM Okay, we'll stand by.

SPACECRAFT Okay, go ahead

CAPCOM Roger, the Westar they have found the spacecraft and the spacecraft is separated now and is in orbit of 155 by 600 miles, it was received by the Hughes station in Fillmore, California, and the batteries are charging up, bus currents look good, but it is in a 155 by 600.

SPACECRAFT You have any idea yet, Mary, about what might have been the problem?

CAPCOM No sir, we haven't found any really good ideas yet.

SPACECRAFT Mary, does that mean they're getting data from it that they know the batteries are charging?

CAPCOM That's affirmative, they had data received from the Spacecraft.

SPACECRAFT Mary, what sort of inclination is it in? That is could we, could it have had an out of plane burn, or what?

CAPCOM Bruce, this is Houston, not sure but think it's in the same inclination as the Orbiter. And the payload --

SPACECRAFT Okay, we copy.

CAPCOM The payload folks are going to collect a bunch of that data for you and it will be in your message when you get up tomorrow morning.

SPACECRAFT Okay, we'll appreciate it.

CAPCOM Hope you guys get a good peaceful rest, then we'll talk to you tomorrow.

SPACECRAFT Okay, see you tomorrow. Get those speaker checks for you in just a minute, Mary, how much time we got?

CAPCOM Roger, we're standing by for your speaker checks. And you've got 20 more minutes.
How much time we got?

Roger, we're standing by for your speaker checks, and you got 20 more minutes.

Houston, Challenger, with a comm check on the upstairs speaker.

Challenger, Houston, have you loud and clear, how me?

Okay, sounds good, we got you the same Mary.

Houston, this is Challenger, voice check on the downstairs.

Challenger, Houston, read you loud with a squeal, over.

Okay, Houston, how about now, still have a squeal?

Challenger, Houston, we read you but you're still squealing.

This is Mission Control Houston, Orbiter Challenger now passing over Asia on the way towards the Pacific Ocean. Here in the Mission Control Center we've handed over to the planning team and we do anticipate beginning the change-of-shift briefing with off-going Flight Director Harold Draughon about 4:35, about 5 minutes late, in response to some queries in the news center. That last call up to the crew from CAPCOM Mary Cleave discussing some information about the Westar satellite is - some of those numbers are based on some rough information from Hughes, the builder of that satellite, as well as information discussing that telemetry lockon this afternoon in which it's believed that it was discovered that Westar is recharging its batteries and we'll be more than happy to entertain questions about that during the change-of-shift briefing in about 15 minutes. At mission elapsed time 2 days 9 hours 23 minutes, this is Mission Control Houston.

This is Mission Control Houston, Orbiter Challenger on its 39th orbit now travelling 17,321 statute miles per hour, heading out over the Pacific Ocean. Planning shift here in the Mission Control Center is working to put together a day's events for tomorrow which include the PALAP deploy on orbit 50 and they're attempting to structure it so that they can get some housekeeping items done in the morning before that deploy and leaving room for a one-orbit late deploy should that prove necessary. We do understand that a representative of Westar will be involved in the change-of-shift briefing which is now scheduled to occur approximately 4:35 p.m. At 2 days 9 hours 25 minutes, this is Mission Control Houston. END OF TAPE
PAO Mission Control Houston, at Mission Elapsed Time, 2 days 10 hours 32 minutes, the Orbiter Challenger now over the heart of Central Africa, on orbit 40 just above the equator. Here in the Mission Control Center, the planning shift is looking at various options for tomorrow morning's activities and planning just where to put those in the timeline prior to the PALAPA deploy. And also the planning team is taking a look at some of the video downlinks from this afternoon and this morning. Right now they're watching some camera shots of the IRT deploy which both did and did not work today. At Mission Elapsed Time 2 days 10 hours 33 minutes, this is Mission Control Houston.

PAO This is Mission Control Houston, at Mission Elapsed Time, 2 days 11 hours 10 minutes. The Orbiter Challenger has just passed out of range of the Guam tracking station on orbit 40, now over the mid Pacific Ocean in a 151 by 150 nautical mile orbit. And at the end of this orbit on the other side of the Earth at the equator when we begin orbit 41, we will have travelled 905,000 miles, so far on the shuttle mission. At this time in the Mission Control Center, the flight director is getting a weather briefing on landing opportunities for the next couple of days should an early landing become necessary. Elsewhere in the Mission Control Center, the planning shift teams are looking at plans for tomorrow and looking at the desire to perform some maintenance and service their spacesuits in preparation for Tuesday's spacewalk. Also we'll do a nitrogen psi adjustment in the Orbiter and we'll also conduct a deploy of the PALAPA satellite on rev 50. They're also planning to look at the possibility for doing a Westar sunshield inspection with the robot arm camera sometime tomorrow afternoon after we've deployed the PALAPA. Also, as far as Westar is concerned, Western Union reported today that they did succeed in locking on to that satellite's weak signal at about 2:30 p.m. central time. Westar is now at a 190 by 758 nautical mile orbit according to NORAD, an inclination of 27.7 degrees and a period of 100.1 minutes. At Mission Elapsed Time, 2 days 11 hours 11 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, at Mission Elapsed Time 2 days 12 hours 37 minutes. Orbiter Challenger now over the Guam tracking station passing through the tracking station, this is not a voice pass nor are we taking data. With the crew of course in their sleep period, here in the Mission Control Center, the planning team is putting together tomorrow's activities....

END OF TAPE
PAO Mission Control, Houston. Orbiter Challenger now on orbit 42 over north Africa. The way the schedule seems to be lining up for tomorrow here on the planning shift, we're looking for a star tracker detail test objective in the morning intended to see if we can sight some pieces of the Integrated Rendezvous Test article, the IRT. We'll also be performing in the morning a 10.2 cabin depress which would prepare for Tuesday's extravehicular activity. That cabin depressurization has to be in place for at least 12 hours prior to the EVA. They also intend for the crew to catch up on some of the SPAS experiments, perform some maintenance on the space suits themselves, the two which will be used in the EVA. On rev 50, they'll deploy PALAPA, they'll also -- for the PKM burn, the PAM kick motor burn on rev 51, they will have the robot arm extended to a position from which it can view that burn in a procedure called the witness plate test and we also will be able to see that through the use of the camera on the end of the robot arm. After the PKM burn, they will do a recircularization burn of their orbit, if required. They will also be taking a look if possible, they'll take a look at a couple of sites on earth that are of some interest to the people on the ground here. The two prime earth observation sites are in Senegal, where there are some dust storms underway and in Hawaii where Kilauea is active. And it is now 2 days, 13 hours, 42 minutes into the mission, Shuttle flight 41-B, this is Mission Control, Houston.
PAO Mission Control, Houston. We are AOS Dakar and taking data. Crew still has about 2 hours left in their sleep shift, their sleep period. Orbiter Challenger currently in a 151 by 150 n. mi. orbit. Here in the Mission Control Center, the planning team has basically completed putting together the CAP for tomorrow, and now working with various housekeeping duties. At Mission Elapsed Time, 2 days, 15 hr, 7 min, this is Mission Control, Houston.

PAO Mission Control, Houston. Mission Elapsed Time, 2 days, 15 hr, 46 min. The Orbiter Challenger now on orbit 43. Here in the Mission Control Center on the planning team, INCO reports a problem with the traveling wave tube assembly, and the K-band antenna from the Orbiter. That problem is being seen in the form of a no-power outreaching from the K-band antenna, and that means that we can take S-band telemetry from the Orbiter, not K-band telemetry from the Orbiter. The effect of that, basically, resides in two areas, should there be no resolution to the problem, and there are some fixes that are potentially possible with that assembly. Two areas that could be affected are TV, television coverage during the second EVA now scheduled for Thursday, and potentially, perhaps, some effect on Shuttle K-band radar during both those EVA's, although there's a fix for that also. And we'll just have to wait and see if it works. Basically, what this means is that they've got to wait until the crew wakes up, then the controller's going to have them cycle power on that assembly in the hope that if it's a logic problem, they can get it to come back on. If it's some sort of short, or burnt tube, or something like that, then it's doubtful they can resurrect that device. We will be able to take S-band and then go through the regular GSTDN stations, but we will not be able to transmit television through the K-band. The reason that affects just the second EVA and not the first EVA is that in the EVA now scheduled for Tuesday, we'll be in attitudes with the Orbiter that approximate those we'll have during the solar max repair visit in April. And those attitudes are not conducive to pointing the antenna on the Orbiter toward the Tracking and Data Relay Satellite; thus, we've only been planning to have GSTDN television during that first EVA. That constraint does not exist during the second EVA, so we were planning to have some TV through the TDRS, and should we not be able to resurrect the device, we will have to replan that and see if we can't come up with some GSTDN coverage for that EVA on Thursday. Again, the antenna is going to have a cycling procedure done on it tomorrow and we'll see if we can't bring that device up. There is no crew safety impact here, no mission impact here, and no flight rule cases which come up because of this occurrence. At Mission Elapsed Time, 2 days, 15 hr, 50 min, this is Mission Control, Houston.

END OF TAPE
PAO ...no mission impact here and no flight rule cases which come up because of this occurrence. At Mission Elapsed Time, 2 days 15 hours 50 minutes, this is Mission Control, Houston.

PAO Mission Control Houston, an update on the K-band situation with the travelling wave tube assembly. One of the potential problems discussed there had been K-band radar but there are a number of ways in which you can avoid any problems there. One is that as long as an object you're tracking, such as an astronaut and an MMU, is less than 640 feet from the Orbiter, you don't need to go through the travelling wave tube assembly, anyway, so it may well be that even if that device is out, radar tracking during the EVAs will work well. Without radar tracking during the EVAs, there's no safety impact there. Our crewmen won't be far enough away from the Orbiter for that to be a crew safety issue. There had been a desire to go ahead and use that device so we could get familiar with it and understand some of the nuances of it with relation to the SMM repair visit in April where that device would be needed. Two days 15 hours 52 minutes, this is Mission Control, Houston.

PAO Mission Control Houston. Processing S-band telemetry through TDRS as the Orbiter Challenger approaches orbit 44 at the equator, just at the tip of South America. We have the intention of cancelling the scheduled 12:30 a.m. change-of-shift press conference with off-going flight director Larry Bourgeois due to a lack of relative activity in the news rooms at JSC and KSC. If there are any objections to that plan, please, as is the drill, call either of those news centers and they'll get the word to us. At Mission Elapsed Time, 2 days 16 hours 27 minutes, this is Mission Control, Houston.

PAO Mission Control Houston, Orbiter Challenger now on rev 44 over the mid Atlantic Ocean, at Mission Elapsed Time 2 days 16 hours 38 minutes. We still have our intention of cancelling the 12:30 a.m. change-of-shift press conference, with off-going flight director Larry Bourgeois. This is your last call for objections to that plan. If you do have such objections, please call the JSC news room or the KSC news room. This is Mission Control, Houston.

PAO Mission Control Houston, Orbiter Challenger now on rev 44 over North Africa. We're expecting the crew wake-up call to go up through Yarragadee but we do note that there is some CRT activity on the flight deck, so it looks as if at least some members of the crew are up and about already. The wake-up music today for those of you who follow these things, the first song will be "Glory, Glory, Colorado" by the University of Colorado band. That's the fight song of that institution which is Vance Brand's alma mater and that will lead straight into rendition of "Ride High You Mustangs" the Cal Poly State University fight song
which is pilot Robert Gibson's alma mater. At Mission Elapsed Time, 2 days 16 hours, 57 minutes, this is Mission Control, Houston.

PAO Mission Control, Houston, we have cancelled the 12:30 a.m. change-of-shift briefing with flight director Larry Bourgeois. Mission Elapsed Time 2 days 17 hours Mission Control, Houston.

(wake-up music)

END OF TAPE
CAPCOM (Wake-up Music)

CAPCOM Good morning, Challenger. With you over Yarragadee for 2-1/2 min.

CAPCOM Challenger, Houston with you at Yarragadee for 2 min.

SPACECRAFT Good morning, John. (Garble).

CAPCOM Morning. How are you'll today?

SPACECRAFT Pretty good. We, incidentally, only received 2-1/2 CAP overviews.

CAPCOM Roger. Understand, and you'll be getting the rest of the CAP's in about 45 min over MILA.

SPACECRAFT Okay. Understand you'll send up the rest over MILA.

CAPCOM That's affirm, and we're sorry we didn't get it up to you.

SPACECRAFT That's okay. Part of one was garbled. It was -- some of the things were backwards on it.

CAPCOM Understand, so, you'd appreciate three copies.

SPACECRAFT Five total copies.

CAPCOM Say again, Bruce.

CAPCOM Challenger, Houston. We're going LOS Yarragadee in 30 sec. We understand you have two good copies of the CAP. We intend to send you three over MILA.

SPACECRAFT Okay, John, and we were just talking over the wake-up song. Bruce says it's "Army, Army Call the Doctor."

CAPCOM No, we gave you "Glory, Glory Colorado" and "Ride High You Mustangs", and we'll see you TDRS 17 plus 48.

SPACECRAFT I have a feeling that "Glory, Glory Colorado" also exists as "Army, Army Call the Doctor" back at the Naval Academy.

CAPCOM Understand that, Bruce.

SPACECRAFT And of course, everyone knows "Ride High You Mustangs." (Garble).
PAO: This is Mission Control, Houston. We're out of range of Yarragadee now. Handover has occurred in the Mission Control Center, and Flight Director Randy Stone and the Orbit 1 team of flight controllers is now on station. The CAPCOM is John Blaha. The wake-up music was first "Glory, Glory Colorado" by the University of Colorado band and the fight song for the alma mater of the Mission Commander, Vance Brand. Mission Specialist Bruce McCandless alleges the same tune, different words, are used at his alma mater, Naval Academy. And the second wake-up music was "Ride High You Mustangs," the Cal Poly State University fight song, St. Louis Obispo, California, the alma mater of Robert Gibson, the Challenger Pilot. And we will pick up again through TDRS in 20 min. Mission Elapsed Time, 2 days, 17 hr, 27 min. This is Mission Control, Houston.

END OF TAPE
PAO St. Louis Obispo, California, the alma mater of Robert Gibson, the Challenger pilot. And we'll pick up again through TDRS in 20 minutes. Mission Elapsed Time, 2 days 17 hours 27 minutes, this is Mission Control, Houston.

PAO This is Mission Control, Houston, we're just a few seconds away from acquiring signal through the TDRS network. Mission Elapsed Time is 2 days 17 hours 48 minutes. During this pass INCO will be commanding the Ku-band, just cycling power to that system to see if we can recover the failed wave tube in there. We should have voice contact momentarily. This is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through TDRS.

SPACECRAFT Roger, John, we just got the IMU alinement and we'll go to the IRT track attitude now, a little ahead of time if that's alright.

CAPCOM Roger that, that's okay, Vance.

SPACECRAFT And Houston, did you get the IMU aline data, if not I can read it to you.

CAPCOM Negative, we did not Vance. We'll take that from you but right before we do that, let me just tell you that we suspect a power problem occurred on the Ku-band because last night we think we lost the Ku-band return link and so INCO will be cycling your Ku-band here and you may get a message. You can ignore it.

SPACECRAFT Okay.

CAPCOM And I'm ready to copy your IMU data.

SPACECRAFT Okay, stars 21 and 17 angular air .01, starting with delta X, minus .04, minus .09 plus .01. Delta Y plus .07 plus all balls minus .03. Delta Z plus .10 minus .10 plus .08 execution time T/17:47:30, over.

CAPCOM Roger, copy the data, Vance, thanks a lot.

PAO This is Mission Control Houston, the INCO has cycled power to the Ku-band antenna system and it looks very favorable that that system may be recovered, the Ku-band is showing up with power. We're going to wait until there's an opportunity to get some Ku-band downlink, of course, to verify that. But at least at this point, it looks as though the power cycle function and the effect of resetting the logic on the Ku-band, it may be back in order after all. So that will be good news, of course, inasmuch as it would save the ample video we hadped to acquire during the second EVA on Thursday. Mission
Elapsed Time, 2 days 17 hours 59 minutes, this is Mission Control, Houston.

PAO This is Mission Control, Houston. The INCO's just reported that we are now processing high data rate on Ku-band. That means, of course, the Ku-band system is again operative. Mission Elapsed Time, 2 days 18 hours 1 minute, this is Mission Control Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Vance.

SPACECRAFT John, I have a question on the microbiology air sample, if there's somebody around that could answer this for me. We have stowed onboard three types of agar strips for the sampling. I have to take samples on the middeck and the flight deck, my question is am I to take one of each kind on the middeck and one of each kind on the flight deck per data take or is it two of each kind on the flight deck and two of each kind on the middeck, the medical checklist does not describe those numbers. I was briefed on the preflight but I need to get some confirmation.

CAPCOM Roger, understand Ron, I'll try to get you an answer.

SPACECRAFT Thank you John.

END OF TAPE
SPACECRAFT check the, medical checklist does not describe those numbers. I was briefed on it preflight but I, I need to get some confirmation.

CAPCOM Roger, understand Ron, I'll try to get you an answer.

SPACECRAFT Thank you John.

CAPCOM Ron, people have looked at your request and the answer is one of each type on the middeck and the flight deck.

SPACECRAFT Okay, that sounds good, John. There are just so many of these strips around, I was wondering, should I have been doing them at a faster rate but that's the way I did. The last data take and that's the way I'll do the next. Thank you.

CAPCOM Roger that and we're going to be handing over to the STDN here.

SPACECRAFT Okay.

CAPCOM Challenger, Houston, you have a target state vector onboard now.

SPACECRAFT Okay, great, thanks John.

SPACECRAFT Houston, Challenger, you ready for PCM formats 103, 161?

CAPCOM Roger, we are ready for the formats.

SPACECRAFT Okay.

CAPCOM Challenger, Houston. We're going to be handing over to the Dakar, Madrid STDN here so we can get our teleprinter message up to you.

SPACECRAFT Okay.

CAPCOM Challenger, Houston, we are seeing an unusually high propellant usage, nothing to be alarmed with. We believe you are not tracking the IRT, we want you to go ahead and initiate the rendezvous nav.

SPACECRAFT Roger.

PAO This is Mission Control, Houston. The consensus in the Control Center here is that the high propellant consumption rate was the product of the Orbiter hunting around for its target and changing its attitude in search for the rendezvous target. By initiating the rendezvous nav on coordinates that the Control
Center uplinked, the navigation -- or the system will lock on to the IRT and will terminate that hunting phenomenon and should use less propulsion --- less fuel. Mission Elapsed Time, is 2 days 18 hours 33 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston, we're going LOS in a couple of minutes with TDRS. See you at Yarragadee at 18 plus 54.

SPACECRAFT Okay, John, I guess you dropped out for awhile. He didn't have anybody to point to, did he, sorry about that.

CAPCOM Roger, that's okay.

PAO This is Mission Control Houston, at 2 days 18 hours 43 minutes. We're out of range at TDRS and we'll reacquire in 11 minutes through Yarragadee. Flight directors presently get a weather briefing, the substance of which is that all the weather at all the landing opportunities today is good and weather doesn't present any...

END OF TAPE
PAO ... So we'll reacquire in 11 minutes through Yarragadée. Flight Directors presently get a weather briefing, the substance of which is that all the weather at all the landing opportunities today is good and the weather doesn't present any landing constraints at any of the prime locations. Challenger on orbit 45, just crossing the equator over the Indian Ocean. At mission elapsed time 2 days, 18 hours, 44 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston's with you at Yarragadée for 7 minutes.

SPACECRAFT Roger Houston, Challenger, loud and clear.

CAPCOM Roger that and Vance, just to let you know, you guys didn't do anything wrong with that. We just sent you a bad plan this morning.

SPACECRAFT Well, I don't know. I hope we didn't use too much gas, anyway.

CAPCOM No, you did not. No problem, Vance, and it was our plan that did it. You certainly didn't do anything, you just followed the plan. And Challenger, Houston, we're wondering if you're getting any marks on the target?

SPACECRAFT No, we don't have star for reference yet. Yesterday it was starting to show up just a little later as the Orbiter moved so we're still hopeful. Also, we don't see it in the COAS yet, but we'll keep checking.

CAPCOM Understand.

SPACECRAFT Okay, now we have a star present so we'll have to check and see what it is.

CAPCOM Great, sounds good.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Vance.

SPACECRAFT Okay, we're getting a star presence in and out. Sometimes we get it for up to half a minute or so. The residual elevation residual is +1.66 and azimuth -1.82 to start out with, with a ratio of 1.7 and 1.6, respectively. We don't have star presence now so we'll see what the next data brings.

CAPCOM Roger, I understand.
CAPCOM  Challenger, Houston, we're going LOS, Yarragadee. See you a couple of minutes at Orroral.

PAO  This Mission Control, Houston. There's a one minute, 30 seconds keyhole here between Yarragadee and Orroral. Mission elapsed time 2 days, 19 hours, 2 minutes, this is Mission Control, Houston.

CAPCOM  Challenger, Houston's with you at Orroral for 4 minutes.

SPACECRAFT  Roger John. We haven't had any star presence since we talked to you last.

CAPCOM  Understand. Challenger, Houston, we're going to be going LOS here, Orroral in 50 seconds. If somebody's back by A7L, I have a switch.

SPACECRAFT  Go ahead.

CAPCOM  Roger, the MADS strain gage to ON, please. And we'll see you TDRS at 19 plus 25.

CAPCOM  Challenger, Houston, did you copy MADS strain gage to ON?

SPACECRAFT  John, MADS strain gage is ON, O N.

CAPCOM  Roger, thank you Bruce. See you guys at TDRS.

PAO  This, Mission Control, Houston. We'll pick up through TDRS in 17 minutes at mission elapsed time presently, 2 days, 19 hours, 9 minutes.

CAPCOM  Challenger, Houston's with you through TDRS.

SPACECRAFT  Roger Houston, loud and clear. Houston, the star, rather, the IRT tracking exercise.

CAPCOM  Roger, go ahead Vance. We just got the last half of your transmission but we're interested in the summary of that.

END OF TAPE
SPACECRAFT The star, rather, the IRT tracking exercise.

CAPCOM Roger, go ahead Vance, we just got the last half of your transmission but we're interested in the summary of that.

SPACECRAFT Okay, right near sunset, we got steady star presence, we, it looked like it was the IRT and it was not a star, so after several cycles I went to AUTO on SPEC 33 on angles. We took in one mark, in auto on azimuth) we got a mark reject on elevation and then I put in about 3 forces and the sum total of it was that in elevation we got 2 accepts, in azimuth 4. We got elevation 9 rejects to azimuth 7.

CAPCOM Roger, copy that Vance, thanks a lot.

SPACECRAFT Bruce spotted what he thought was the IRT on the horizon, very faint, just before sunset. But we're not really sure if it was that or a star, to tell you the truth. I think you'll have to look at the data. It's a little puzzling to us whether we really had the IRT or not.

CAPCOM Understand Vance, thanks for the good report. And Challenger, Houston, we're seeing a little bit high fuel usage again, we'd like to go ahead and execute the maneuver back to ZLV.

SPACECRAFT We thought we were there, just a sec, we're on the way.

CAPCOM Challenger, Houston, we think you need to go ahead and do an item 19 to get the maneuver going.

SPACECRAFT Okay, we wanted auto maneuver shut up apparently it didn't take for some reason.

CAPCOM Roger, understand, no problem. Challenger, Houston, if you have a minute I have a note for Bruce or Bob.

SPACECRAFT Okay...

SPACECRAFT Houston, go ahead, they're listening.

CAPCOM Roger, because..

SPACECRAFT (garble) John.

CAPCOM Roger, Bruce. Because we are down to one WCS water fan sep, we recommend you only dump and charge the EMU's one time each and do one EMU at a time.
SPACECRAFT  Understand you want to do one EMU at a time and we will go ahead and do the one dump and full charge on each EMU over.

CAPCOM  That's affirmative as shown there in the CAP at 22:45.

SPACECRAFT  Roger, tell the guys in the back room thanks.

CAPCOM  Roger, that Bruce. Challenger, Houston, we're sending up an orbiter state vector to you.

SPACECRAFT  Roger.

CAPCOM  Challenger, Houston, I have a question for ya'll, relevant to the EVA, when you have a second.

SPACECRAFT  Okay, go ahead, John.

CAPCOM  Roger, assuming that the EVA 1 goes on time and all goes well, we're considering the following additions to the end of the EVA number 1. The first one is prior to airlock ingress, to have you remove camera D and bring it with you into the airlock and into the cabin for inspection and repair and reinstallation during EVA 2.

SPACECRAFT  Okay, we copy that.

CAPCOM  Roger. And just for a little more clarification there the repair is just a swapout of cameras. And the second one is while in the MFR, after your MEB task is complete to close the cinema 3...

END OF TAPE
CAPCOM And the second one is while in the MFR after your MEB task is complete to close the Cimena 360 thermal cover.

SPACECRAFT Okay.

SPACECRAFT Stand by a second on that one, John.

CAPCOM Roger, ya'll can think about that and get back to us whenever you want to.


CAPCOM Roger, Bruce, go ahead.

SPACECRAFT Okay, John, with respect to your recommendation on the Cimena 360, if you all concur, what we'd like to do is we would like to attempt closing that up by hand early in the EVA. The EVA timeline as you may recall starts out with me on the port MMU getting it ready to fly and then Bob breaks out the T-pad and has it over there by the SESA and has a period of relatively low activity. During this time we think it's feasible for him to translate down the starboard hinge line and then manually lean inboard and close it up by hand with no net serial impact to the timeline, also enabling you to have the Cimena 360 functional for essentially the entire EVA. If that does not work, or proves to be cumbersome or anything like that, then we certainly concur with your recommendation that I do it from the MFR after the MEB task. Over.

CAPCOM Roger, understand Bruce, and we concur with your sequence.

SPACECRAFT Okay, then that's the way we'll plan it then. Thank you very much, and we'll do the payload bay camera delta. Do you have any thoughts as to the measure of protection that we ought to provide for it in bringing it through the airlock? I guess we could have one of these transfer bags or temporary bags in there so we could bag it and provide some protection for the lens and all that stuff. Over.

CAPCOM Roger, and Bruce, at the moment, we're just thinking of tethering it to the foot restraint but we will work some details for you and teleprinter them up to you.

SPACECRAFT Understand the foot restraint in the airlock?

CAPCOM Yes.

SPACECRAFT I use that foot restraint in the airlock for operating the hatch, I think we would prefer to secure it somewhere else in the airlock.
CAPCOM Understand and we'll work up some procedures, Bruce, and send them up to you and give you time to comment.

SPACECRAFT Okay, we copy John, thank you very much.

CAPCOM You're welcome and we thank ya'll.

SPACECRAFT Hey John you got time to copy a number?

CAPCOM Roger.

SPACECRAFT Okay, HRM III time of activation day 2 195030.

CAPCOM Roger, copy and thanks a lot, Bob.

SPACECRAFT You all think up some more stuff for us to do so we won't get bored operating the EVA.

CAPCOM Roger, understand.

SPACECRAFT Just joshing.

SPACECRAFT And also John, is there anything that we ought to look at with respect to the part of the IRT that remains in the payload bay that would help you figure out the puzzle? Or you just want to wait till the vehicle gets back on the ground to look at that?

CAPCOM Stand by 1. And Challenger, Houston, be advised that we have some excellent pictures of the release. We don't need any additional information from you right now other than your flight notes.

SPACECRAFT Roger.

CAPCOM And we're happy to wait until we see your flight notes postflight. And if someone has a second I'd like to give you a small change to the cabin depress procedures in the contingency EVA ops book on page 5-4.

SPACECRAFT Hey, John, I've got it open down here, go ahead, let's see.

SPACECRAFT Is that contingency EVA book or EVA book?

CAPCOM The contingency EVA ops book for the 10.2 cabin.

SPACECRAFT Okay, John, go ahead, we're ready to copy.

END OF TAPE
CAPCOM ... contingency EVA OPs book for the 10.2 cabin.

SPACECRAFT Okay John, go ahead, we're ready to copy.

CAPCOM Okay, on page 5-4, on the left side over there, Bruce, the M010W 14.7 regn, let system 2 open. We want you to not do that step at that point. You can do the system 1 to close but take the step that takes system 2 to open and place it after, over there on the bottom right, after you have reset the FDA and caution warning limits.

SPACECRAFT Okay John, let me see if I'm understanding what you're saying here. The step which is on M010W 14.7 cabin regn, let system 2 to open should be moved over to the bottom of the right hand column essentially following the IMU fan delta P SM alert limit change, is that correct? Over.

CAPCOM That's absolutely correct.

SPACECRAFT Okay, we copy. Any other EVA changes at this time?

CAPCOM Negative.

SPACECRAFT Okay, thank you. I'm getting back to my (garble) now.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead Vance.

SPACECRAFT John, just a point of information. All of our normal EVA procedures are in the EVA checklist. I guess that represents a duplication for the 10.2 depress procedure you just mentioned but anyhow, we probably won't be pulling out the contingency EVA checklist unless we had a contingency EVA.

CAPCOM We understand, Vance.

SPACECRAFT And John, if you concur, I can start the SPAS activation and get the comm configuration loaded but hold on the MOMS until after the water dump. Over.

CAPCOM Stand by, Ron, and we'll get you an answer.

CAPCOM Challenger, Houston, the SPAS activation is okay to do now. We don't have a MOMS data take coming for awhile and we will monitor the water dump.

SPACECRAFT Okay John, thank you.

CAPCOM Challenger, Houston. We don't have any data right now so maybe you've already done it, but we see you in fixed
format and we'd like you to go ahead and select the program on SPEC 62.

SPACECRAFT Okay, he'll be getting that. Okay, that's accomplished, John.

CAPCOM Roger, thanks a lot and we have data now.

SPACECRAFT Okay, we finished the SPAS activation. The water dump is complete and we're go for the -- proceed with the MOMS.

CAPCOM Roger that.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead, Ron.

SPACECRAFT Yes John, in the MOMS activation step 1, it started off with a power FTS bus amps of 6.1 amps. After setting the MOMS experiment power on, I have now, that's 13.4 amps. Now suppose that you see an increment of one amp now that's... Why don't you take a look at that?

CAPCOM Okay, Ron, Payloads will look at it for you.

SPACECRAFT Thank you.

CAPCOM Ron, to answer your question on the MOMS, you had the little bit high amperage because the heaters came on and that is Ops normal.

SPACECRAFT Yes John. I was just looking at my ref data, page 8-6 and I see that. Heaters are on so I'll proceed with that amps. Thank you.

CAPCOM Roger that, Ron.

SPACECRAFT Okay John, you got the MOMS activation at 20 plus 50.

CAPCOM Roger, we copy. And Challenger, Houston.

SPACECRAFT John, how's my comm coming to you?

END OF TAPE
Okay, John, you got the MOMS activation at 20 plus 15.

Roger, we copy. And Challenger...

John, how's the comm coming to you?

Roger, you're comm is...

Go ahead John.

Your comm is loud and clear.

Hey, great, we fixed that by doing nothing.

Understand, we're going LOS here in a minute, we'll see you at Yarragaddee at 20 plus 29.

Okay, John, we copy and ask the EVA backroom to give some thought to what position they would like camera delta in. We can move it around and pan and tilt manually if you have a position that you want it other than what it is right now during the EVA 1.

This is Mission Control Houston, we're losing signal through TDRS and we'll reacquire through Yarragaddee in 10 and a half minutes. A couple of items worthy of note during that TDRS pass, additions to the EVA timeline. First to remove the delta camera, that's the forward starboard camera, the color camera that's been providing limited service with a faulty color wheel, inability to tilt and a bulky and intermittent pan function. Bruce McCandless has agreed to take that camera inside the Orbiter and replace it with another camera during that EVA, first EVA. And also, Mission Specialist Bob Stewart will be attempting to buckle up the thermal package on the Cimena 360 camera. This is Mission Control Houston. There is a good indication that the crew's right on the timeline. The EVA systems officer here in the Control Center has indications that the Mission Specialist 2 and 3, Bob Stewart and Bruce McCandless were set up to do their prebreathe and the EECOM had their sensors indicating that there was an oxygen flow, verifying that their prebreathe started at, occurred at 2 days 20 hours 11 minutes Mission Elapsed Time. And the prebreathe is flagged as an LEH prebreathe, LEH is launch entry helmet, and the launch entry helmet provides a good seal for the crewmembers to use to assure their breathing pure oxygen without having to go through the full suit up procedure. It's an expedient way of getting a good prebreathe for protocol. And we're approaching the time for the 10.2 cabin pressurization. The cabin pressure right now shows at 13.9 psi and it has been consistently right around that
number throughout the flight, ranging between this and 14.1. We'll reacquire through Yarragadee in 5 and a half minutes at Mission Elapsed Time, 2 days 20 hours 23 minutes this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through Yarragadee for 7 and a half minutes.

SPACECRAFT Okay, Houston, we got you loud and clear at Yarragadee.

SPACECRAFT And, John, we got a couple of guys running around here in funny looking helmets.

CAPCOM Roger, understand, I have a question for you reference the SPAS activation.

SPACECRAFT The martians are coming, the martians are coming.

SPACECRAFT Okay, John.

CAPCOM Roger, during the activation we saw the battery come on line for about 45 seconds and then go back off. If you could provide us any information that would help us understand that, we'd appreciate it.

SPACECRAFT Okay, John, I think that battery switch got hit...

END OF TAPE
CAPCOM ... 45 seconds and then go back off. If you could provide us any information that would help us understand that, we'd appreciate it.

SPACECRAFT Okay John, I think that battery switch got hit prior, before, prior to the -- some time early in the activation, the battery switch got hit before-- at some point early, I think the battery switch was hit. When I got the data with the SPAS, I saw that the battery was on, I went and hit the battery switch to off. That's when you saw the battery amps go.

CAPCOM Roger, absolutely no problem with that, Ron. We just wanted to make sure that it wasn't something that we didn't understand.

SPACECRAFT Yes, I switched the batteries off but I saw that. So I think the switch was hit earlier in the activation.

CAPCOM Roger and no sweat, no problem.

CAPCOM Challenger, Houston, we're going LOS, Orroral in 30 seconds. We'll see you TDRS, 21 plus 02.

SPACECRAFT Hey John, we just had a nice view of Australia on this run.

CAPCOM Roger that. And we hope you enjoy your sunset again today.

SPACECRAFT Okay, won't be long.

PAO This is Mission Control, Houston. We'll pick up signal through TDRS again in about 10 minutes and at that time we'll just be beginning the process of reducing cabin pressure to 10.2 psi. When we took data through Orroral, cabin pressure was up to 14.0, and has been approximately that range through most of the flight. The Orbiter was tested at a 10.2 psi in pressure on STS-7 and at that time, it took 25 minutes to get the cabin's pressure down to that level through an orifice bleed. And the crew reported no discomfort at any time during that process, so the cabin depress here is not expected to be a traumatic event by any measure and we'll stand by for an advisory that that process is underway when we reacquire through TDRS in 10 minutes. At mission elapsed time, 2 days, 20 hours, 52 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through TDRS.

SPACECRAFT Roger Houston. Houston, this is Challenger, we just have gotten 45 minutes into LEM breathing so we're starting the cabin down to 10.2 shortly.
CAPCOM  Roger that, thanks a lot, Vance.

PAO  This is Mission Control, Houston, it's 2 days, 21 hours, 3 minutes mission elapsed time. The data shows that they are configured to begin the depress procedure but that hasn't begun yet. Should start momentarily. And, again based on the experience from the test during STS-7, it should take just about 25 minutes to reduce cabin pressure from its present level of 14.1 down to the target of 10.2.

Okay.

PAO  This is Mission Control, Houston, The EECOM officer reports that the depress is in work now and the pressure in the cabin has dropped down to 13.77 psi. Now down to 13.69 and again the expected duration to achieve 10.2 would be 25 minutes, so we should see the completion of this process during this TDRS pass.

END OF TAPE
PAO: So we should see the completion of this process during this TDRS pass. Mission Control Houston. The cabin pressure now down to 12.80 psi. Mission Elapsed Time, 2 days 21 hours 11 minutes. Mission Control, Houston, at 2 days 21 hours 15 minutes, Mission Elapsed Time, cabin pressure now down to 12.0 psi and steadily dropping. Mission Control, Houston, 2 days 21 hours 19 minutes cabin pressure down to 11.0 psi. This is Mission Control, Houston, at 2 days 21 hours 24 minutes Mission Elapsed Time, cabin pressure is now to 2.2.

CAPCOM: Challenger, Houston, just for your information, we will be sending a ground commanded MOMS data take in about 12 minutes at 21 plus 36.

SPACECRAFT: Okay, we copy that John. And Houston, we just completed the depress and we're holding cabin pressure at 10.2, PPO2 on sensor B reading 2.77.

CAPCOM: Roger, copy and thanks for the report Vance.

PAO: This is Mission Control, Houston. That data also seems to indicate that Bruce McCandless and Bob Stewart have completed their LEH prebreathing.

CAPCOM: Challenger, Houston, due to a sensor bias, we need you to change the PPO2 alpha hardware caution and warning limit on the high side to 3.0 instead of 2.9.

SPACECRAFT: Okay, we copy that John, we'll change PPO2 alpha on the high side to 3.0.

CAPCOM: Good read back. Challenger, Houston, if somebody is free, I have some, a few additions to your CAP for today's activities.


CAPCOM: Roger, Vance. The changes are on page 3 of 3 of the CAP. When you have that I'll give you the small little changes.

SPACECRAFT: Okay, go ahead.

CAPCOM: Okay, down there at 3:20, maneuver to minus ZLV, when you do that, use DAP A and configure B for B1.

SPACECRAFT: Okay, we copied, use DAP A for that maneuver and configure DAP bravo to bravo 1.

CAPCOM: That's affirmative. And also down at the bottom of the page at 7 plus 35, while you're doing that maneuver down there, the same addition, DAP A and configure B for B1.
SPACECRAFT    Okay, we copy the same comment down at 7 plus 40.

CAPCOM      Roger, that, and over in the right column at 5 plus 00, where it says VTR deact, add TV deact also.

SPACECRAFT    Okay, John, add a TV deact at the same time as VTR deact at about 5 plus 00.

CAPCOM      Roger that and you can also add, do that at Hawaii, LOS, both of those items.

SPACECRAFT    Okay, copy. Hawaii LOS for both.

CAPCOM      Roger, good readback. Challenger, Houston, we're uplinking a state vector and just for your information, INCO's power cycle earlier this morning made the Ku-band function properly now.

SPACECRAFT    Okay, good, sure glad you got it fixed.

CAPCOM      Roger, that.

SPACECRAFT    Houston, Challenger.

CAPCOM      Roger, go ahead.

SPACECRAFT    John, just a comment on the teleprinter format we got today. It's quite good, we've each taken our section and cut it into pages and pasted them in the CAP pages where we'd ordinarily be. It turns out if each guy has his own pages and he can tote his book around with him, it works out great, having two...

END OF TAPE
SPACECRAFT ... great. We've each taken our section and cut it into pages and pasted them in the CAP pages where we'd ordinarily be. Turns out if each guys has his own pages, and he can tote his book around with him, it works out great. Having two columns works good too. Since everybody knows his job up here, more or less, and we just check things off in two columns as we go along.

CAPCOM Roger that. Thanks for the comments, Vance. Challenger, Houston, we're going LOS TDRS in about a minute and a half. See you at Yarragadee at 22 plus 04.

SPACECRAFT Okay, we'll see you at Yarragadee, John.

PAO This is Mission Control, Houston. We've lost signal through the TDRS system. Cabin pressure onboard Challenger holding fairly steady at 10.2 psi and the prebreath by astronauts Bruce McCandless and Bob Stewart has been completed. We will reacquire through Yarragadee in 9 minutes. At 2 days, 21 hours, 55 minutes, this is Mission Control, Houston.

CAPCOM Challenger, Houston is with you through Yarragadee for 7 minutes and 40 seconds.

CAPCOM Challenger, Houston is with you at Yarragadee for 6 minutes.

SPACECRAFT Hello Houston, we got you loud and clear, how do you read us?

CAPCOM Loud and clear. Challenger, Houston. Bruce, if you're free for a minute, I have a short note for you.

SPACECRAFT Okay John, go ahead with the notes.

CAPCOM Roger, just wanted Bruce to know that we will be sending you a teleprinter message at Hawaii that provides an IFM procedure for a contingency EMU water dump, in case it is necessary to use it.

SPACECRAFT Okay John, we didn't hear you real clearly but we understand you're going to send us a teleprinter at Hawaii giving Bruce an IFM for contingency EMU water dump.

CAPCOM That's affirmative and that's just in case you need to use it to back us up because we're down to one fan.

SPACECRAFT Okay John, but understand the plan which I'm starting right now was to use the normal water dump for the EMU as a (garble).
CAPCOM That's correct Bruce, we want to use the normal one. This is only in case we need it so it will be onboard.

SPACECRAFT Okay, we copy.

CAPCOM Challenger, Houston, we're going LOS, Yarragadee in 35 seconds, see you at Hawaii at 22 plus 33.

SPACECRAFT Okay we'll see you in Hawaii. John, we'd like to know if it's alright if we reset the hardware caution and warning to a memory clear.

CAPCOM Roger, that's fine with us, Hoot.

SPACECRAFT Okay, thanks JOHN.

PAO Mission Control, Houston. We'll acquire again in 19 minutes through Hawaii, mission elapsed time 2 days, 22 hours, 13 minutes. This is Mission Control, Houston. We've been given a preliminary advisory time for PALAPA deploy. Deploy time for the Indonesian satellite will be at 3 days, 2 hours, 11 minutes and 13 seconds. That is roughly 3 hours and 41 minutes from now. We are just a few seconds away from acquisition of signal through Hawaii at mission elapsed time, 2 days, 22 hours, 32 minutes, this is Mission Control, Houston.

PAO Challenger, Houston's with you at Hawaii for 3 minutes.

SPACECRAFT Okay John, go ahead.

END OF TAPE
CAPCOM: Challenger, Houston's with you at Hawaii for 3 minutes.


CAPCOM: Challenger, Houston, we're going to be going LOS here in 40 seconds, see you in a couple of minutes with TDRS and we look forward to seeing you pass across the southern Texas sky in about 12 minutes.

SPACECRAFT: Okay, we'll be there, you going to have the right lighting?

SPACECRAFT: Should we blink our lights?

CAPCOM: Roger. Challenger, Houston is with you TDRS.

SPACECRAFT: Hello, Houston, we got you loud and clear on TDRS.

SPACECRAFT: Houston, Challenger.

CAPCOM: Roger, go ahead.

SPACECRAFT: Yes, John. I understand yesterday that we had a few problems with the front cockpit lighting during our TV. Apparently, what you're seeing is perhaps somewhat different from what we see on our monitor. If you like, I'd like to send you a bit of cabin TV just to get your critique of the lighting and so I can get a feel for what's good for you.

CAPCOM: Understand Ron and we'll see where INCO wants to put that in the line. And, Ron, we're going to try make MILA this pass and if no joy there, we'll do it at Hawaii on the next pass.

SPACECRAFT: Okay, John, thank you.

CAPCOM: Challenger, Houston, we're ready for TV now over MILA if you want to do it.

SPACECRAFT: Okay, John, stand by. Okay, John, we're not going to accomplish what I wanted to at this point. On your call, we just had the entire lighting changed by going into sunlight and I've got hot spots all over the place now. It'll have to work those out and see if I can get them out before this pass is over.

CAPCOM: Understand. Do you think you still want to try that over Hawaii on the next pass?

SPACECRAFT: Yes, I think we'll be in a more stable condition there and the light won't change on us as it did just then.
Right as we acquired MILA, we came into sunlight and we just have an unoptimum condition right now.

CAPCOM Understand. Challenger, Houston. If you could go ahead and turn on a payload bay camera, we'll go ahead and downlink some TV and control those cameras if that's okay.

SPACECRAFT Okay, John, we'll do that.

PAO Mission Control, Houston. Since we're not going to get the interior views and the lighting tests but we are configured for TV, we're going to go ahead and take some Earth views from the payload bay cameras.

SPACECRAFT Okay John, you have the (garble) payload bay camera.

CAPCOM Roger, INCO has it and he's going to operate it.

SPACECRAFT Okay, John, you're (garble) middeck camera, we've touched it up a bit, you might try it.

CAPCOM Roger, copy, Ron. And we're out in the payload bay now but INCO heard your comment.

SPACECRAFT Okay, we see, we see that.

CAPCOM And Challenger, Houston. For your information you guys really looked beautiful as you crossed our sky from west to east a few minutes ago.

SPACECRAFT Great, John.

SPACECRAFT Okay, I wanted to check out the forward cockpit lighting at this time. It's the setup we're going to use during the PAM reports.

CAPCOM Roger, understand. We'll look at it and comment for you, Ron. Challenger, Houston, just for your information that lighting really looks great, Ron.

SPACECRAFT Okay, John, that's what I wanted to know. I wanted to see if what looks good to me looks good to you. We can adjust our monitors and it'll look fine to us but won't necessarily be the case.

CAPCOM Roger, we understand, I'll tell you, your picture right now is absolutely superior.

END OF TAPE
CAPCOM ... that lighting really looks great, Ron.

SPACECRAFT Okay John, that's what I wanted to know. I wanted to see if what looks good to me looks good to you. We can adjust our monitors and it will look fine to us but it won't necessarily be the case.

CAPCOM Roger, we understand. I'll tell you, your picture right now is absolutely superior.

SPACECRAFT Okay John, you might try the flight deck camera as well. We have touched it up also.

CAPCOM Roger, we're over the hill for that now, Ron. But what we did see really looked good. Challenger, Houston, we'll be set up at the next Hawaii pass for those TV views.

CAPCOM Challenger, Houston, we're going to go ahead and turn off the payload bay alpha camera from the ground unless you want it.

SPACECRAFT John, why don't you leave the cameras with me awhile and I'll power them down and I think we had better write off that Hawaii pass. I found out what I wanted to know and we're going to start getting our setups ready for the PAM deploy so if you don't mind, we'd like to call that one off, that Hawaii pass TV.

CAPCOM Roger, understand, not do the Hawaii pass TV on the next pass.

SPACECRAFT That's affirmative.

CAPCOM Okay, we concur and we also concur you can keep that camera A until you don't need it.

SPACECRAFT Okay, thanks a lot. Hey John, do you still hear us?

CAPCOM Roger.

SPACECRAFT You ready for an ACE PAM gimbal check?

CAPCOM Roger, we're ready.

SPACECRAFT Okay John, ya'll see the state of the temps?

CAPCOM Roger, the temps look good to us.

SPACECRAFT Okay, I'm going to terminate.
CAPCOM: Roger that, and you guys are really ahead of the timeline there, looks good. Challenger, Houston. While we're talking here if somebody has a minute, I have a small update to the 10.2 cabin maintenance block on page 5-6.

SPACECRAFT: Okay, we're listening but stand by just a sec.

CAPCOM: Roger, I'll stand by.

SPACECRAFT: Okay, go ahead.

CAPCOM: Okay, Vance, down there on the bottom of the page the PPO2 alpha sensor, as you know it's biased a little bit, so change the 2.8/2.8 to 2.9/2.9.

SPACECRAFT: Okay, got it.

CAPCOM: And over on the other side of the page there, the PPO2 alpha 2.9/2.9, change that to 3.0/3.0.

SPACECRAFT: We got all that, John, thank you.

CAPCOM: Roger that.

SPACECRAFT: For your information, the water dump on EMU no. 1 is complete and the water charge is about halfway through.

CAPCOM: Roger, thanks a lot, Bruce.

CAPCOM: Challenger, Houston. I have a cleanup from your LEH prebreathe when you have somebody over by L2.

SPACECRAFT: Okay John, is that going to require a written entry or just some verbal stuff, go ahead.

CAPCOM: I just have one switch for you when somebody's over there.

SPACECRAFT: (garble)

CAPCOM: Okay on L2 there, the O2 crossover system 2 to OPEN.

SPACECRAFT: Roger, we got that.

CAPCOM: Okay and then your config looks good.

SPACECRAFT: John, we didn't see that in the backout procedure. Did we miss something?
CAPCOM: Roger, it's there in the LEH prebreath terminate procedure, Vance.

END OF TAPE
SPACECRAFT  -- we didn't see that in the backout procedure, did we miss something.

CAPCOM    Roger, it's there in the LEH prebreathe terminate procedure, Vance.

SPACECRAFT  Okay, thank you.

CAPCOM    Roger. Challenger, Houston, we're going to be going LOS Botswana here in about a minute. We're in attitude that we may have blanking from TDRS so we'll be in and out as we go LOS. So we will see you at Yarragadee at 23 plus 40.

SPACECRAFT  Okay, John, and real quick with you, I've completed the water recharger (garble) number 1, took up 6.31 to 6.08 of tank C3 percentage to fill it. The final number was toggling back and forth, that's 6.31 to 6.08 percent over.

PAO      This is Mission Control Houston, we still have some remaining time on the TDRS system before we lose signal but there will likely be no transmission because of the pointed angle, makes antenna lockup dice, at this junction. Bruce McNadeless reporting that he had completed the charging EMU number 1 with water, extravehicular mobility unit and we'll begin work on the MU number 2 now, subsequently. Mission Specialist Ron McNair doing some TV activation in preparation, set up in the flight deck and mid deck and Bob Stewart checking the temperatures on the airborne support equipment which forms part of the payload assist module for the PALAPA satellite, in anticipation of that deploy just less, just barely less now, than three hours from now. And our next opportunity for communication will be in 11 minutes through Yarragadee at Mission Elapsed Time, 2 days 23 hours 29 minutes, this is Mission Control Houston. Mission Control Houston, we'll have a voice through Yarragadee in just a moment at 2 days 23 hours 40 minutes Mission Elapsed Time.

CAPCOM    -- with you at Yarragadee for 7 minutes.

SPACECRAFT  Challenger and when you're ready to copy, I got some spec 77 temperatures for the EVA backroom for you, over.

CAPCOM    Ready to copy, Bruce.

SPACECRAFT  Okay, 77 MMU temperatures, I'm going to read them left to right, top line down to bottom line, starting off FFS toggle valve left plus 48 plus 108, right plus 95 plus 89. MMU toggle valve left plus 35 plus 59, right plus 56 plus 58. GN2 tank left plus 41 plus 41. Right plus 39 plus 40. CEA plus 55 plus 59, over.

CAPCOM    Roger, Bruce. We copied all that. Thanks a lot.
SPACECRAFT: The time on that was MET of 2 days, 23 hours, 27 minutes, over.

CAPCOM: Roger that.

SPACECRAFT: Houston.

CAPCOM: Roger, go ahead.

SPACECRAFT: Yes, had a question on this, on the CAP that you uplinked this morning on the teleprinter. You showed a TV activation at about 23 10 PAM deploy. Why is the activation that early? Do you really want it at that time? Do you want to, is INCO going to take control or what's the reason for the early activation?

CAPCOM: Stand by one, Ron. I'll get back to you on that.

SPACECRAFT: Okay.

CAPCOM: Ron, we put it there just to try to give you a little bit of extra time so you wouldn't have to do it after the meal and get rushed. You can do that when you want to.

SPACECRAFT: Okay.

CAPCOM: But it's okay to go ahead and do it right now, Ron, if you want to do that as well.

SPACECRAFT: Yes, I think I'll delay a little while. I don't want to overtip any of them. I'll get it before we get into the checklist.

CAPCOM: That's fine. Your call.

END OF TAPE
Yes, I think I'll delay it a while. I don't want to over tip any of them. I'll get it before we get into the checklist.

That's fine, your call.

John, one more question, you got us opening the WESTAR sunshields pretty early. You really want them open for a full rev before deploy?

Roger, we'll get an answer from Payloads for you. Challenger, Houston, we like the time shown there in the CAP, so if you want to use that, that's what we'd like.

Okay, we'll open WESTAR at 0030 and continue with the deploy starting at about 0100 for PALAPA.

Roger that. Challenger, Houston, we're going LOS in 30 seconds here at Yarragadee. See you at Hawaii at 00 plus 05.

Okay, John, see you then.

Mission Control, Houston, it's 2 days, 23 hours, 48 minutes mission elapsed time. Hawaii is next in 20 - in 17 minutes.

Challenger, Houston, is with you through Hawaii for 7 1/2 minutes.

Hello, Houston, loud and clear.

Roger, you're loud and clear also.

This is Mission Control, Houston. The Orbiter passes directly over the big island of Hawaii in this pass just south of Honolulu and Owahue. Mission elapsed time is 3 days, 0 hours, 6 minutes.

Challenger, Houston, we're going to go LOS here at Hawaii, we'll see you in a couple of minutes with TDRS.

This is Mission Control Houston standing by for reacquisition through the Tracking Data Relay Satellite at 3 days, 0 hours, 15 minutes.

Challenger, Houston is with you thru TDRS.

Houston, loud and clear through TDRS.

Roger.
SPACECRAFT  Jon, we would like to take down the teleprinter until after the PAM deploy so we can make use of that PS audio station, over, if you concur.

CAPCOM  Roger, Ron, we concur with that, we don't have anything to send you until after the deploy so you can take it down.

SPACECRAFT  Ok, thank you, Jon, we will reconfigure right after the deploy.

CAPCOM  Understand.

PAO  This is Mission Control Houston, 3 days, 0 hours, 21 minutes, handover underway here in the Control Center. In about 10 minutes the crew will open the sunshield to the Palapa satellite. That shield is (garble) launched, or is in the open position when the Orbiter is launched. Then shortly after getting onorbit and opening the cargo bay doors the crew closes the sunshields to both satellites and then shortly before again beginning their deployment activities for a specific satellite they then open back up that sunshield. That's due to take place in about 10 minutes and then the crew will begin reviewing their procedures for the deployment of the Palapa. That deployment --

END OF TAPE
PAO shortly before again beginning there deployment activities for a specific satellite, they then open back up that sunshield. That's due to take place in about 10 minutes, and then the crew will begin reviewing their procedures for the deployment of the Palapa. That deployment, to take place at about 11 minutes after 9, this morning, central time. The Challenger is on orbit number 49. And the deployment would be scheduled to occur as the Orbiter crosses the equator on the southward leg of its groundtrack, on orbit number 50. That would be half way through orbit number 50 as the orbit number changes on the northward leg of the groundtrack as it crosses the equator.

CAPCOM Challenger Houston, I have your final deploy pad when you're ready to copy. And be advised we're sending you the deploy TMBU to load the ID in time.

SPACExACTRAFT Okay, John, let us get the Westar sunshields open right now, and then we'll copy the pad.

CAPCOM Roger, standing by.

SPACExACTRAFT Okay, John, I guess you probably saw we had a nice smooth opening on the Westar sunshield. Now I'd like to go ahead and power the Westar SCA while we're working back here if that's all right with y'all.

CAPCOM Roger, I'll check with payloads. We are go to do that, Bob.

SPACExACTRAFT Okay,

PAO This is Mission Control, Mission Specialist, Bob Stewart reporting that they had completed the opening of the Westar sunshield. That sunshield must be bolted back so that the crew can observe the Palapa satellite, which is located behind the Westar in the payload bay. Stewart then asked if there was any objections to his stowing the sequence control assembly. The handheld unit which, with which the crew operates, sends the commands to open sunshields and perform the various other functions in the deployment sequence.

SPACExACTRAFT Okay, Jon, this is Challenger, we're ready to copy pads.

CAPCOM Roger, your deploy time, MET 003/02:13:16, GMT display 037/15:13:16, GMT table +03 251 596, deploy at 054.29 187.17, 293.09, read back.

SPACExACTRAFT Houston, this is Challenger.

CAPCOM Roger, go ahead.
SPACECRAFT      Jon, you broke up on the last, start with the
deploy attitudes again, please.

CAPCOM          Okay, deploy at roll 054.29, pitch 187.17, yaw
                 293.09, read back.

SPACECRAFT      Okay, Jon, deploy call MET 003,/02:13:16, GMT
display 037/15:13:16, GMT table +03 251 596, deploy attitude roll
                 054.29, 187.17, 293.09.

CAPCOM          Roger, that is a good read back.

SPACECRAFT      We can copy the sep pad now if you'd like.

CAPCOM          Roger, we do not have that available.

SPACECRAFT      Okay.

END OF TAPE
CAPCOM    Roger, we do not have that available.
SPACECRAFT  Okay.

CAPCOM    Challenger, Houston, we're handing back from MILA back to TDRS, see you up TDRS in a couple of minutes.
SPACECRAFT  Okay, Jon.
CAPCOM    Challenger, Houston is with you through TDRS again.
SPACECRAFT  Roger, Jon, we got you.
CAPCOM    You're loud and clear as well.
SPACECRAFT  Were you on TDRS awhile ago when you faded out?
CAPCOM    Roger, say again, Bob?
SPACECRAFT  Yes, I was just asking were you on TDRS awhile ago when you faded out?
CAPCOM    Negative, we were over MILA.
SPACECRAFT  Okay.
CAPCOM    Challenger, we're shipping up as Orbiter state and we'll have your sep pad in a few minutes.
SPACECRAFT  Roger, Jon.
CAPCOM    Challenger, Houston, I have your sep pad when your ready to copy.
SPACECRAFT  Okay, Jon, we're ready.

CAPCOM    Roger, OMS left, TV roll, 180. Trim + 0.0 + 5.1 NA, weight 216 197, TIG 3/02:28:16.0. Peg 7 +0010.6, +000.0, -003.0, burn at roll 029 pitch 113 335, delta V TOT 0011.0, TGO 00:12, VGO ax +0010.38 +002.21, +002.94, HA 1157 by +151, left OMS helium, vapor number alpha to open and bravo to close, and a note for a left OMS engine fail, continue +X, RCS, VGO X only, with the left OMS interconnect, read back.

SPACECRAFT  Okay Jon, I've got left OMS, 180 +0.0 +5.1 NA, 216197, 3/02:28:16.0, +0010.6, all balls, -003.0, 029, 113 335, 0011.0, 00:12, +0010.38, +002.21, +002.94, 157 by +151, alpha open, the bravo closed, for a left OMS engine fail we'll go +X RCS, VGO only with the interconnect of left OMS.
CAPCOM    Roger that's a good read back, and I have 1 more addition that you will need for the sep burn, which is on page 3-15 of the deploy checklist.

SPACECRAFT   Okay, we're ready to copy on 3-15.

CAPCOM    Okay, Hoot, because your interconnected left OMS to RCS, the reference there to check crossfeed 4 closed, will not be applicable to you. Your crossfeed switches as they are, are good. And down there in the post burn reconfig, where it refers to the crossfeeds 4 you can delete it there as well.

CAPCOM    Okay, we copy that one, when we get to that step, we'll just continue to crossfeed to the RCS from the left OMs.

CAPCOM    That's affirmative.

END OF TAPE
Okay, we copy that. When we get to that step Jon we'll just continue the crossfeed to the RCS from the left OMS.

That's affirmative.

Challenger, Houston. We're shipping up your targets for the sep burn.

Okay, thank you.

This is Mission Control Houston. 3 days, 0 hours, 49 minutes mission elapsed time. We're moving along toward a scheduled deployment of the Palapa, the Indonesian Communication Satellite at 11 minutes after 9 central time this morning or in about an hour and 20 minutes. CAPCOM Jon Blaha has just read up to the crew the final deployment figures, the times, the Orbiter attitudes and pointing information and the information relating to the separation burn by which the Orbiter will move away to a protected distance from the Palapa Satellite before its payload assist module solid rocket engine ignites 45 minutes after deployment from the Orbiter's cargo bay. The crew has started the countdown clock leading toward the deployment and is currently reviewing their procedures prior to the deployment. The satellite will leave the cargo bay of the Shuttle, orbit #50 as it crosses the equator just over the coast of South America on the southward leg of its groundtrack at about 11 minutes after 9 this morning. The crew has performed the thermal checks on the airborne support equipment and the payload assist module of the Palapa and all of that data looks good at this time. The inertial measurement units which are used to keep the Orbiter properly aligned and pointed in the right direction, is very critical for a good deployment, are all holding in well after being aligned earlier this morning. And the handover here in Mission Control is about to conclude between the shift of the offgoing Flight Director Randy Stone and that of Harold Draughon who will be present for the deployment of the Palapa this morning. The Orbiter systems continue to look good and very little there to give any concern to flight controllers, take their attention away from the deploy activities. We are currently in communication with the Spacecraft through the tracking data relay satellite. Challenger is over the South Atlantic on orbit #49 and we have about 14 minutes remaining of that coverage before we have a loss of signal period.

Houston, Challenger. You ready to watch a gimbal check?

Roger, we're ready.

Roger, we are ready.

Okay, here it comes.
CAPCOM Challenger, Houston. We're going to be going LOS here at Botswana in about a minute. We have TDRS in and out due to blanking. We'll see you at Yarragadee in 10 minutes.

CAPCOM Challenger, Houston. We're going LOS here at Botswana. We'll see you in 10 minutes at Yarragadee and for your information INCO has turned off the Ku.

SPACECRAFT Roger, understand.

CAPCOM Roger that.

CAPCOM Challenger, Houston with you through Yarragadee for 5 and a half.

SPACECRAFT Jerry, good day. How are you today?

CAPCOM Doing just great. Sounds like you guys are cooking right along this morning.

SPACECRAFT We're munching through the checklist here.

END OF TAPE
STSB-41-B AIR/GROUND TRANSCRIPT t154j 037:14:16 2/6/84 PAGE 1

SPACECRAFT We're marching through the checklist here.

CAPCOM Challenger, Houston. We're 1 minute till LOS here at Yarragadee. To help us sync up voice with the video, we would like you on panel Al take payload outlets ICOM A and B to on and off. Hooter, we see the left OMS propellant tank pressures coming down. At Guam we'll ask you to repress those, over.

SPACECRAFT Houston, Challenger. Are you still with us?

CAPCOM Roger, we're 15 seconds till LOS. Did you copy last?

SPACECRAFT We copied something about the left OMS propellant tank but we didn't hear what it was.

CAPCOM Okay, 5 seconds till going over the hill. We'll talk to you at Guam in 8 minutes.

SPACECRAFT Okay.

PAO This is Mission Control Houston. 3 days, 1 hour, 22 minutes mission elapsed time. We've had loss of signal through the Yarragadee station and we'll pick up over Guam in about 7 and a half minutes. Crew is proceeding through the predeployment checkout of the payload assist module and the Indonesian satellite which is about 50 minutes away from now. They have initiated the countdown clocks. Mission Control Houston. We're standing by for acquisition through the Guam station in about a minute. Crew continuing with their predeployment checkout.

CAPCOM Challenger, Houston with you at Guam for 5 minutes and is Hooter available?

SPACECRAFT Okay, yes Jerry. Go ahead on the OMS.

CAPCOM Okay Hoot. We see that the left OMS propellant tanks are coming down in pressure. We'd like you to go ahead and repress those, please.

SPACECRAFT Okay, repress the OMS tanks.

CAPCOM Okay and also Challenger, for someone on the aft flight deck. To permit us to make sure we have good sync between voice and the video at Hawaii. On Al, we'd like the payload outlet ICOM switches both alpha and bravo to on, please.

SPACECRAFT Jerry, we turned them on last time you called. Are you sure they're not on on the ground there?
CAPCOM: That's negative Bruce. We don't and I'm sorry we didn't get a copy from you that you had heard us.

SPACECRAFT: Roger, roger.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.

SPACECRAFT: Okay Jerry. The flight deck TV camera overtemped just a little while ago and we turned it off just like we did on the first deploy. We put it in command in case late in the game we forget to get it back on.

CAPCOM: Okay, I think INCO copied that. Thank you.

SPACECRAFT: Throw it to on probably but if not, it's in the command position.

CAPCOM: Copy that, Vance. Thank you.

PAO: Mission Control Houston. 3 days, 1 hours, 36 minutes mission elapsed time. We're counting down to deployment of the Palapa in about 36 minutes and in just a few minutes we'll be catching the downlink television from the Spacecraft of the pre-deployment activities currently going on board. That'll be over the Hawaii station. Crew is proceeding along the timeline with the predeployment activities. Turning on the, shortly they'll be turning on the payload bay floodlights, configuring the cabin lights for television and going through all the final preparations before the mechanical sequence start which begins at 15 minutes before deployment. That sequence starts with opening the sunshield, removing the restraints and beginning the spin up. When the spin has been verified as appropriate, then the final count activities will continue.

END OF TAPE
That sequence starts with opening sunshield. Removing the restraints, and beginning the spin up. When t
has been verified as appropriate, then the final count act will continue. Terminal sequence begins at 3 minutes prior
deploy. Mission Specialist 1, Ron McNair, initiates the term sequence, followed at 1 minute 30 seconds before deployment about 2 minutes away from the Hawaii station, at 3 days, 1 ho

CAPCOM Challenger, Houston, with you through Hawaii for

SPACECRAFT Houston, Challenger, loud and clear.

CAPCOM Roger, and we've got TV.

SPACECRAFT Jerry, we turned off our flight deck cameras probably bring them up now. Say again Vance, okay we see (garble).

PAO And this is Mission Control, the Payload Officer reports all the data from the payload assist module looks good. We're counting down to the deployment about 29 1/2 minutes from now.

CAPCOM Challenger, Houston. We're about a minute to LOS at Hawaii. Back with you in a couple of minutes through TDRS, and for Bob a couple of notes for you on your checklist there. First of all Barbara is a little concerned you may lose your page number there, and also ECON says that's it's interesting how that thing spins longer in a 10 2 cabin.

SPACECRAFT You've got to have something to do while waiting for a temp check, here in 4 seconds.

PAO That's a view of the Orbiter's flight deck. Commander Vance Brand there at the aft flight deck. Bruce McCandless now in the picture. The crew going through the final preparations for the deployment of the Palapa which will occur in about 24 minutes. We'll pick up again in just a couple of Control.

CAPCOM Challenger, Houston on TDRS.

SPACECRAFT Challenger, Houston, through Goldstone.
PAO That sequence starts with opening sunshield, removing the restraints, and beginning the spinup. When the spin has been verified as appropriate, then the final count activities will continue. Terminal sequence begins at 3 minutes prior to deploy. Mission Specialist 1, Ron McNair, initiates the terminal sequence, followed at 1 minute 30 seconds before deployment by the arming of the - prearming of the vehicle ordinance. We're about 2 minutes away from the Hawaii station, at 3 days, 1 hour, 39 minutes, this is Mission Control.

CAPCOM Challenger, Houston, with you through Hawaii for 5 minutes.

SPACECRAFT Houston, Challenger, loud and clear.

CAPCOM Roger, and we've got TV.

SPACECRAFT Jerry, we turned off our flight deck cameras because of overtemp problem, if you want those too, we can probably bring them up now. Say again Vance, okay we see (garble).

PAO And this is Mission Control, the Payload Officer reports all the data from the payload assist module looks good. We're counting down to the deployment about 29 1/2 minutes from now.

CAPCOM Challenger, Houston. We're about a minute to LOS at Hawaii. Back with you in a couple of minutes through TDRS, and for Bob a couple of notes for you on your checklist there. First of all Barbara is a little concerned you may lose your page number there, and also ECON says that's it's interesting how that thing spins longer in a 10 2 cabin.

SPACECRAFT You've got to have something to do while waiting for a temp check, here in 4 seconds.

PAO That's a view of the Orbiter's flight deck, Commander Vance Brand there at the aft flight deck. Bruce McCandless now in the picture. The crew going through the final preparations for the deployment of the Palapa which will occur in about 24 minutes. We'll pick up again in just a couple of minutes over the tracking data relay satellite. This is Mission Control.

CAPCOM Challenger, Houston on TDRS.

SPACECRAFT Loud and clear, Jon, make that Jerry.

CAPCOM Challenger, Houston, we're getting some good TV through Goldstone.
SPACECRAFT    Okay Jerry, we're glad you've got good TV.
SPACECRAFT    Houston, Challenger.
CAPCOM        Go ahead, Vance.
SPACECRAFT    Okay, Ku power standby then panel command and then on. I understand that's not necessary now?
CAPCOM        That's affirmative, we've already commanded it off, Vance.
SPACECRAFT    Okay, thank you, I won't touch it.

PAO          This is Mission Control, Payload Officer reports mechanical sequence start and the sunshield coming open. PAM sun-, the Palapa sunshield reported open, and the starboard restraint being withdrawn. And we're seeing the spinup of the Palapa at the rear of the cargo bay of the Orbiter. Payload Officer reports that the spin is stable at 50 revolutions per minute. And the Palapa spacecraft is reported to be on internal power, properly configured for its deployment, to occur in 11 minutes.

END OF TAPE
PAO and the Palapa spacecraft is reported to be on internal power. Properly configured for its deployment to occur in 11 minutes. Mission Specialist, Ron McNair, working at the video monitors at the right of the aft flight deck. Guidance Officer reports the Orbiter is very stable. And the Payloads personnel indicating that everything looks good for the deployment to occur in about 8 minutes and 38 seconds.

CAPCOM Challenger, Houston, Palapa is go for deploy.

SPACECRAFT Roger, Jerry. Everything's looking real good to us up here.

CAPCOM Copy that, and that's affirm down here as well.

PAO And we're beyond the range of the MILA station, where we're getting the television, we won't be getting the live television of the actual deployment because that would have employ the Ku-band radar and we are unable to use that while the payload is unprotected there. To avoid radiating the payload there in the cargo bay. So we'll be getting that on video tape, and it will be played over the Hawaii station, the next orbit around. They also expect to be recording the visual observations by the RMS camera, at the start of orbit 51, as the Orbiter observes the firing of the perigee kick motor. The payload assist module as it occurs crossing the equator over orbit 51. Here in the Control Center we're now 5 minutes away from the deployment and the crew has proceeded down through the timeline, everything looks good. The payload's officer has giving a go for the deployment of the satellite. The Orbiter is very stable, and the satellite is on its external power and spinning at 50 RPM's. Mission Control, 3 days, 2 hours, 9 minutes, mission elapsed time. Approaching the beginning terminal sequence start at 3 minutes before deploy. Payload Officer reports terminal sequence start. Everything continues to look good, as leading up to the deployment in 2 1/2 minutes, (garble) Indonesia reporting receiving data from the Palapa spacecraft as it is in the cargo bay of the Shuttle. Less than 2 minutes away from the deployment. The vehicle prearm reported by Payload Officer. PAM safe and arm has been put in arm. One minute and 5 seconds until deployment. Spacecraft safe and arm taken to arm. 40 seconds from deployment. Had deploy prearm. 10 seconds till deployment. Deploy arm. And deploy fire. We'll wait for a report from the crew on the deployment. And we have the sunshield closing back over now to protect the airborne support equipment in the cargo bay which remains behind. The crew is going through their post-deployment procedures, closing the sunshield, and powering down the equipment that was used in the deployment. Crew has loaded the final targets into the computers, for the separation maneuver. Orbiter will move to a distance of several miles away from the Palapa spacecraft and it's payload assist module, at the time of the firing, which is
coming up in about 40 minutes. As the Orbiter and the Palapa both cross the equator at orbit-

END OF TAPE
PAO -- targets into the computers for the separation maneuver. The Orbiter will move to a distance of several miles away from the Palapa spacecraft and its payload assist module at the time of the firing which is coming up in about 40 minutes. As the Orbiter and the Palapa both cross the equator at orbit number, start of orbit #51 which will be right over the Republic of Indonesia at 120 degrees east longitude approximately. We won't be getting the playback on this VTR of the Palapa deploy until the Hawaii pass at 10:17 this morning, about 1 hour from now. The crew reported maneuvering to burn attitude.

PAO Mission Control, 3 days, 2 hours, 19 minutes. Payloads Officer reports that both sunshields are closed now. Those 2 canvas like sunshields are closed back over the vacancies left by the satellites to protect the airborne support equipment from the direct radiation of the sun. That equipment is brought back to earth and reused on subsequent similar satellite missions. We've had no direct contact from the crew on the events of the deploy although we had data on the ground which indicated everything looked normal as the Palapa spacecraft left the Orbiter's cargo bay at precisely the right time.

CAPCOM Challenger, Houston, standing by for a deploy report.

SPACECRAFT Okay, Jerry. The deploy was absolutely nominal, on time, current attitudes are roll 54.49, pitch 187.30, yaw 293.17. The rates roll -.001, pitch 0, yaw 0.

CAPCOM Copy that. Can't ask for any better. Thank you, Bob.

SPACECRAFT Any word from our ex-passenger there?

CAPCOM Everything looks good to us so far, Bob.

PAO This is Mission Control at 3 days.

SPACECRAFT (Garble) the arm right after the burn.

CAPCOM Copy that, Ron. Thank you.

PAO Mission Control 3 days, 2 hours, 25 minutes. Standing by for the OMS sep burn. That occurs in about 2 minutes, 2 1/2 minutes from now. Spacecraft is at the proper attitude awaiting the start of the burn. It's an 11 foot per second change in velocity to move the Orbiter to a safe distance from the Palapa and its payload assist module. We had apparently a very successful deployment and the Palapa Manager congratulating the flight controllers on their roll in an apparently successful deployment. Coming up in just a few
minutes, about 5 minutes will be the start of the Change-of-Shift Press Conference for the off-going Flight Director Randy Stone.

SPACECRAFT Houston.

CAPCOM Challenger, go ahead Houston.

SPACECRAFT Houston, Challenger.

CAPCOM Go ahead, Challenger.

SPACECRAFT We'll give you a gimbal check if you're looking, Jerry.

CAPCOM Okay, Vance. We're in and out of lock here. Stand by one. Go ahead, Vance. We're ready.

SPACECRAFT Okay.

CAPCOM Challenger, Houston for Ron.

SPACECRAFT Roger, Jerry. Got a sick CRT over here. Go ahead with your (garble).

CAPCOM Okay, a couple of quickies for you, Ron.

END OF TAPE
CAPCOM Challenger, Houston for Ron.

SPACECRAFT Roger Jerry. Got a sick CRT over here. Go ahead with your (garble).

CAPCOM Okay a couple of quickies for you, Ron, helping you to set up your cameras. We recommend that you zoom out max on the wrist camera and also focus maximum far and then if you can see the Palapa you can go ahead and zoom back in to whatever you think is appropriate. Also, if you need to, to track the Palapa during its burn to keep it in view you can use minus wrist yaw in single mode.

SPACECRAFT (garble). Okay. Jerry, your're describing tracking the Palapa.

CAPCOM Say --

SPACECRAFT Jerry, I'm going to reset this end code (garble) I think it is.

CAPCOM That's a roger on that, Ron.

SPACECRAFT Okay.

CAPCOM And Challenger, Houston for Ron. One further note on the minus yaw wrist maneuver. We're not recommending that. That's only if you need it to keep it in view.

SPACECRAFT Okay, Jerry. Understand.

CAPCOM Challenger, Houston. We're 1 minutes till LOS Botswana. The comm through TDRS will probably be very shakey at best from here on. Next is Guam at 03 plus 02.

PAO This is Mission Control at 3 days, 2 hours, 59 minutes mission elapsed time. Spacecraft is crossing the equator now and this should be the point at which we get the firing of the perigee kick motor for the Palapa satellite. We'll be attempting to observe that with a camera mounted on the remote manipulator system, the mechanical arm, extended around the side of the Challenger's cargo bay doors. The Orbiter is in a window protective attitude to avoid any possibility that debris or exhaust from the firing of that satellite's booster engine would deposit any material on the windows. We are expecting also to get television playback of the deploy on the upcoming Hawaii pass. That's in about 16 and 1/2 minutes. We're not currently in communication with the Challenger passing over none of the ground stations and not within range of the tracking data relay satellite. We will be coming up over the Guam station in a little less than 2 minutes. This is Mission Control Houston.
CAPCOM        Challenger, Houston with you through Guam for 8 minutes.

SPACECRAFT  Roger, Houston, and we saw the beginning of this burn on close circuit TV here, VTR.

CAPCOM        Roger, copy that and understand it looked good.

SPACECRAFT  It sure did as near as we could tell. It gradually faded out so we never saw the end of the burn but it was rather bright to begin with. Hoot saw it off of the, just off the scope, maneuvered it to the center. Got a pretty good view for probably 30 seconds at least.

CAPCOM        Okay, copy that and we'll be requesting a dump of that also in addition to the deploy video.

END OF TAPE
SPACECRAFT    It sure did, as near as we can tell, it gradually faded out, so we never say the end of the burn, but it was rather bright to begin with. Hoot saw it off, just off the scope, maneuvered it to the center, got a pretty good view for probably 30 seconds at least.

CAPCOM    Okay, copy that, and we'll be requesting a dump of that also, in addition to the deploy video.

SPACECRAFT    Jerry, could you give us a time for that burn, duration of the burn?

CAPCOM    Roger, Bob, that would be 86 seconds.

SPACECRAFT    Okay, thank you.

CAPCOM    And Challenger, Houston, I've got a note on some reconfiguration of PCUMU formats and PDI configurations, when someones ready to copy.

SPACECRAFT    Okay, Jerry, ready to copy.

CAPCOM    Okay, this is in preparation for a MOMS data take at approximately 3 hours 45 minutes and other SPAS activities to follow. After the RMS has powered down, but no later than 3 + 30, we would like to go to TFL 116, 179, and PDI configuration 124.

SPACECRAFT    Okay, Jerry, you're looking for a MOMS data take at 3:45, no later than 3:30, you want to see 116, 179, and you want Decom 1, input 2, format 4.

CAPCOM    I'm sorry, Hooter, it's PDI configuration 124, and that's on FS 1-3 of the orbit pocket.

SPACECRAFT    (Garble)

CAPCOM    Of the orbits ops.

SPACECRAFT    Thanks, Jerry, configuration 124 in the PDI?

CAPCOM    That's affirm, and also one additional note for Ron on the arm. When he's cradling arm this time, if he has problems making get all those talkbacks again, for ready to latch. He is go to leave the RMS power on. That is, don't put the brakes on, and go ahead and latch the arm down that way. Looked like to us on the ground last time, part of the problem, was when he set the brakes to on the arm became a little bit limp, and caused some of the talkbacks to go barberpole.
SPACECRAFT Okay, Jerry, copy that. And that's right, when we put the brakes on, it did cause us some of those problems, talkbacks.

CAPCOM Okay. Challenger, Houston, we have a switch hit for you on A7.

SPACECRAFT Go ahead.

CAPCOM Okay, on panel A7, MADS, strain gage, we'd like that to PCM enable, please.

SPACECRAFT Okay, you've got it, Jerry.

CAPCOM Challenger, Houston, we're 45 seconds to LOS, Guam, Hawaii's next in 6 minutes. And can you advise us, do you intend to dump voice with the video at Hawaii?

SPACECRAFT Jerry, we - that's something we wanted to ask you. We recorded the ICON, pretty much as we did yesterday. We can do it that way, and record through the ICON, or we can play it and dump the voice. Whichever way you like it.

CAPCOM It's your call, Ron, whatever you would like to do, we just want to be prepared on the ground for whatever you're going to send us.

SPACECRAFT Okay, Jerry. We'll send them the ICON. Just as yesterday. With the Westar.

CAPCOM Copy that, thank you, Ron.

PAO Mission Control Houston, 3 days, 3 hours, 11 minutes, mission elapsed time. We have loss of signal through the Guam station, we'll pick up in about 5 1/2 minutes over Hawaii for some downlink television of the Palapa deploy. And if time permits also the downlink of the observation of the PKM burn, the crew reported of having observed about 30 seconds of the perigee kick motor firing of the Palapa satellite. That's full duration is an 86-second burn. They said they saw about the first 1/2 minute of that before it went out of sight. Mission Control Houston, 3 days, 3 hours, 16 minutes, we're about a minute away from acquisition through the Hawaii station, where we will be getting some video tape replay of the Palapa deploy.

CAPCOM Challenger Houston, Hawaii for 6 minutes.

SPACECRAFT Very good.

END OF TAPE
CAPCOM    Challenger, Houston. Hawaii for 6 minutes.
SPACECRAFT Here, Houston.
CAPCOM    And Challenger, we're standing by for playback.
SPACECRAFT Houston, you were cut off by static. Say again.
CAPCOM    Roger, Vance. We're standing by for playback.
SPACECRAFT Roger. Okay, Houston. If you're ready we'll go to play on a small section of tapes that recorded the PKM.
CAPCOM    Roger, Vance. We're ready.
CAPCOM    And Challenger, we're getting a good picture. Be advised TDRS will probably be down for the entire next pass. If we don't get the deploy sequence on this Hawaii pass we'll get it next time.
SPACECRAFT Okay.
PAO      Looking at that portion of the tape which recorded the perigee kick motor firing. The Orbiter's RMS, remote manipulator system, extending over the side to observe that as it crossed the equator at the start of orbit #51.
SPACECRAFT Houston, Challenger. You're seeing the PKM motor now.
CAPCOM    Roger.
SPACECRAFT Okay, Houston. We're going to give you the other tape now, Jerry. That's about all we could see on the PKM motor on that first one so we're going to put the deploy tape in now.
CAPCOM    Okay, sounds good. We've got about 4 minutes left in the pass and suggest you take DAP back to auto.
SPACECRAFT Okay, got it. Okay, Jerry, now you're getting the other tape.
CAPCOM    Okay. Looks good.
SPACECRAFT Stand by one. Let me check something and then I'll start it again.
CAPCOM    Okay, I guess what we're seeing on the (garble) 4 here is real time.
SPACECRAFT Jerry, we're going to have to finish rewinding this tape and then we'll be right back with it.
CAPCOM: Okay.

SPACECRAFT: Okay, if you're ready to take it we'll give you a play.

CAPCOM: Okay, we're standing by.

SPACECRAFT: Okay, Jerry. We're going to fast forward a bit to get the spin and something of interest.

CAPCOM: Okay, Ron. We're 30 seconds till LOS here. We'll get you through Goldstone at 03 plus 28. Recommend we just start it there.

SPACECRAFT: Okay, we'll do it then.

PAO: This is Mission Control. Have a brief break in signal. We'll pick up over TDRS in just a few minutes.

SPACECRAFT: Houston, Challenger.

CAPCOM: Challenger, Houston. Go ahead.

SPACECRAFT: Okay. We checked to see if we had you with us on TDRS. How long is the Goldstone pass?

CAPCOM: Roger. It'll be about 3 and 1/2 minutes, Vance.

SPACECRAFT: Yes, and then you can get Mila after that.

CAPCOM: That's a negative. The next will be Botswana. The next time we'll get a playback will be Hawaii.

SPACECRAFT: Jerry, on this next pass, you want to get the terminal sequence deploy portion or you want to see some sunshield opening? Where would you like to start it?

CAPCOM: Stand by.

SPACECRAFT: Give it all to you on a longer pass but for this 3 minute pass I'll give you what you want.

CAPCOM: Okay. We'd like to get the deploy and we're on Goldstone now. And Ron, we've got live TV while you're getting set up there.

SPACECRAFT: Okay. Okay, Jerry, just one minute.

SPACECRAFT: Houston, Challenger.

CAPCOM: Go ahead, Vance.
SPACECRAFT    Jerry, we're having to fast forward it so we can send the deploy into this 3 minute one.

CAPCOM    Copy that and my information here says that we ought to have an LOS at 03:31:29 for your timing.

SPACECRAFT    Okay, yes, okay.

END OF TAPE
SPACECRAFT    Jerry, we're having the fast forward it so we can slip the deploy into this 3 minute one.

CAPCOM      Copy that.

CAPCOM      And my information here says that we ought to have an LOS at 03:31:29 for your timing.

SPACECRAFT  Okay, yeah okay.

SPACECRAFT  Okay, starboard restraints are out, (garble) motors are enable and on. Good current. Westar (garble) PAM heaters to auto, (garble) PAM heaters to auto. See any red lights? Okay.

CAPCOM      Challenger, Houston, we're less than 1 minute to LOS. If we do not get TDRS back on line our next contact will be Botswana at 04 + 06.

SPACECRAFT  The STA clock is counting. Okay, how long does that take, Jerry?

CAPCOM      We won't be able to get it dumped there, it's an 8 minute pass. It looks like we'll just have to wait till Hawaii to get the entire playback.

SPACECRAFT  Ron, enable SCA 2. (Garble) CSA 2. (Garble) ready next time.

CAPCOM      Okay, no problem. We're getting a good picture right now, I guess we can run through the whole thing at Hawaii, and we've got about 15 seconds at LOS. We'll give you a call if TDRS comes back up.

SPACECRAFT  Okay.

PAO         This is Mission Control 3 days, 3 hours, 31 minutes. We've lost our TV picture of the downlink of the Palapa deploy. We've had no reports yet from the payloads people or the representatives of Indonesia on the tracking of their satellite after its perigee kick motor firing.

CAPCOM      Challenger, Houston through Botswana for 8 minutes.

CAPCOM      Challenger, Houston through TDRS for 3 1/2 more minutes.

SPACECRAFT  Roger, Houston, loud and clear.

CAPCOM      Okay, Vance.

SPACECRAFT  And Jerry, understand we were thinking about of course, going EVA tomorrow, that's why we did the depress, and
all the work on the suits today. The, curious to see whether you expect that to be a page out of the written CAP, or whether you expect quite a bit of change to that?

CAPCOM Okay, Vance, for the first time during the mission, I think we're going to let you use your CAP.

SPACECRAFT Okay, great. I know it's been necessary before, but it seems like now maybe it is possible.

CAPCOM We concur with that, and that's what we intend to do, Vance. I have a couple of notes for you for later in the day if you'd like to copy them.

SPACECRAFT Stand by one. Go ahead.

CAPCOM Okay, I'm referencing message 22 Alfa. You still there?

SPACECRAFT Yes, go ahead.

CAPCOM Okay, I'm getting indications we're breaking here. Referencing the information we sent you in the flight day 4 CAP overview, at 5 hours we called for a OMS burn, that is cancelled. We do not need the OMS burn, the lighting for end of mission is okay. Secondly, at also 5 hours over in the MS column, we had a VTR and TV, you can add TV deact to that.

SPACECRAFT Jerry, you were cut out completely on the first thing, if you could repeat.

CAPCOM Okay, Vance, we'll try one more time here. We'll not do the OMS burn scheduled at 5 hours, over.

SPACECRAFT Okay, scrub the burn scheduled at 5 hours.

CAPCOM That's affirm. The lighting for end of mission is okay. Secondly, at 5 hours under the MS column, we had a video tape recorder deactivation scheduled, you can add TV to that as well.

SPACECRAFT Okay, copy.

CAPCOM And the third thing, also for the MS's scheduled at 5 hours, 50 minutes, in the update was a heat pipe activation, and a note on that --

END OF TAPE
CAPCOM And the third thing also for the MS's scheduled at 5 hours, 50 minutes in the update was a heat pipe activation and a note on that. The activation has to occur between 5 hours 40 minutes and 5 hours 47 minutes, over.

SPACECRAFT It's 5 40 and 5 47 for heat pipe deactivation.

CAPCOM Roger, that's for activation.

SPACECRAFT That's activation.

CAPCOM Okay, Vance. Looks like we may be breaking lock with you again. Guam is next at 04 38.

SPACECRAFT Roger, see you at Guam.

PAO Mission Control Houston. 3 days, 4 hours, 20 minutes mission elapsed time. The Challenger has passed out of range of the tracking data relay satellite on the last portion of orbit number 51. Crew has been informed to cancel the OMS burn that was scheduled for 3 days, 5 hours. That was an orbit adjustment to extend the amount of daylight available for end of mission landing at Kennedy Space Center and the flight dynamics people have calculated that the lighting will be fine for end of mission landing and so there is no need to perform that orbital adjustment burn.

CAPCOM Challenger, Houston with you through Guam for 7 minutes.

SPACECRAFT Okay Houston, loud and clear.

CAPCOM Roger, Vance.

CAPCOM Challenger, Houston. Is Bruce available to talk?

SPACECRAFT Houston, Challenger. How long do we have you for, over this next pass?

CAPCOM Okay Ron. Hawaii acquisition is at 04 52.

SPACECRAFT Houston, Challenger.

CAPCOM Roger, go ahead, Challenger.

SPACECRAFT Houston, Challenger.

CAPCOM Challenger, Houston. Go ahead.

SPACECRAFT And Jerry, how long do we have you over the Hawaii pass?
CAPCOM: Okay. Hawaii acquisition is at 04 52, that's about 11 minutes.

SPACECRAFT: And what's the duration?

CAPCOM: Approximately 7 and 1/2 minutes, Ron.

SPACECRAFT: Thank you.

CAPCOM: And Challenger, is Bruce available to talk?

SPACECRAFT: He's not on the loop right at the moment, Jerry, and be advised that you're giving us a simultaneous broadcast.

CAPCOM: Okay, copy that, and have Bruce give us a shout when he's available.

CAPCOM: Challenger, Houston.

SPACECRAFT: Go ahead, Jerry.

CAPCOM: Roger. We'd like to enable FDA on decom 4, please.

SPACECRAFT: Okay, coming at you.

END OF TAPE
SPACECRAFT Go ahead, Jerry.
CAPCOM Roger, we'd like to enable FDA on decom 4, please.
SPACECRAFT Okay, coming at you.
CAPCOM Challenger, Houston, 20 seconds to LOS, Hawaii next in 7 minutes.
SPACECRAFT Okay, Jerry, we'll see you there. Jerry, if you're still there, we've got the (garble) deactivated at 4+45, and looks like we had a good run.
CAPCOM Copy, Ron, thank you.
PAO This is Mission Control at 3 days, 4 hours, 47 minutes. We have a short break in communication with the spacecraft for about 5 1/2 minutes, till we pick up over Hawaii. This is Mission Control, we're standing by for acquisition through Hawaii where we're going to get a replay of the, rather a downlink of the crew's video tape recording of the Palapa deploy.
SPACECRAFT Houston, Challenger, how do you read?
CAPCOM Roger, loud and clear.
SPACECRAFT Okay, are you ready for that TV.
CAPCOM We're standing by, Ron.
SPACECRAFT Okay, go, with audio. (Garble) restraints are out (garble) on.
CAPCOM And Challenger, Houston, be advised we're getting a good picture with voice.
SPACECRAFT Okay, good, stand by let to roll. (garble) I don't know if we're doing that or if they're moving around back there in the back. Okay, we got 50 RPM and stable. Turn around (garble) okay, Vance, (garble) with the recorder if you get (garble) on 16 (garble) and the VTR you get stopped. Payload recorders are both select. Ron, check the talkback down back there, safe and armed. Ron, (garble) okay, Vance. (garble) They're on. (garble) 145. Here we have terminal sequence. (Garble) be a light meter reading over here. That's 4 amp on 30 seconds to Palapa on, and you're going to get an audio thing. Let me set the P stop. Okay, you're set. 30 seconds to the switches are on. Just say when, Hoot. Okay, Vance now, Cinema 360. Here we have vechicle ordinance prearm, okay Ron, PAM safe and arm to armed, talkback up, it's in arm. Okay — END OF TAPE
SPACECRAFT  (Garble) Here we have vehicle ordinance prearm. Okay, Ron, PAM safe and arm to arm, talkback up. (Garble). Okay, spacecraft safe and arm to arm, talkback up. Spacecraft safe and armed, talkback is up. And I see the (garble). We're holding 30 seconds now for deploy free arm. (Garble) count. 5 seconds. In deploy free arm, talkback gray. (Garble) 70 at deploy, Vance. That 16 handheld somebody. And the SI, spacecraft SIU is disabled. Okay, shut it off. 10 seconds. All indications are good. There she goes. We have a deploy. Do that again. Okay Ron, (garble) PAM heaters to auto. On auto. Deploy free arm off. (Garble) motor 1 currents closing the sunshields. Okay, Vance, 1 minute. Payload recorder can go to mode select. Cinema 360 off. Sunshields are closed. ASE is off. Okay Ron, restraint index insert to off. Insert's turned to off. Movie light should go off. And power down the FCA. FCA's coming down. Way to go, you guys. Looking good. Looking good. Now if it'll just work. Tell me when I run out of film. Okay, Jerry, I see we're going to loose you in a bit. That burn looks good from up here. How does it look down there?

CAPCOM  Roger, that was a good playback, Ron. Some real good video here and we enjoyed the comments that went along with it. We're 30 seconds till LOS. We do not expect TDRS. They are having a ground station problem. Botswana is next at 05 plus 42.

SPACECRAFT  Hey Ron, when you get a chance we need to power up the Westar. Okay, Jerry, we'll see you then.

CAPCOM  Roger, that.

SPACECRAFT  Is that red light on yet?

PAO  This is Mission Control Houston at 3 days, 5 hours, 1 minute mission elapsed time. We've had a loss of signal through the Hawaii station following that VTR dump of the Palapa deploy from the Spacecraft. We do not expect the TDRS link to be working on this pass due to a ground station problem at White Sands and we will have a long loss of signal period here now of approximately 40 minutes before we reacquire over the Botswana station in Southern Africa. Our next television event coming up at 12:10 pm central standard time, the satellite playback of this VTR dump that you just saw. This is Mission Control, Houston.

END OF TAPE
PAO -- Central Standard Time. The satellite playback of this VTR dump that you just saw. This is Mission Control Houston.

CAPCOM Challenger, Houston through TDRS.

SPACECRAFT Go ahead, Houston.

CAPCOM Ok, I think we're going to keep lock with you for a while on TDRS. And Challenger, Houston, a question as to whether or not your teleprinter has been reconfigured to receive messages, and would like to talk to Bruce if he's around.

SPACECRAFT Ok, Jerry, you cut out for a lot of that net, we're checking the teleprinter, and Bruce will come up and talk to you.

CAPCOM Copy, Hoot.

SPACECRAFT Houston, Challenger, we have not hooked the teleprinter back up yet.

CAPCOM Ok, copy that, just let us know when you've got that configured.

SPACECRAFT Ok, will do, and I think Bruce is getting to a headset to talk to you.

CAPCOM Copy.

SPACECRAFT I don't think we've got it reconfigured. They are off. That your supper, Vance? Beef steak? It's not bad. I had that for lunch.

CAPCOM Challenger, we're copying a hot mike down here.

SPACECRAFT Houston, this is Challenger, go ahead, Jerry.

CAPCOM Ok Bruce, we're talking down here about another contingency EVA, looking at trying to fix the MASS SPEC. If you've got a couple of minutes, I'd like to talk to you about it and see what your thoughts are. First of all, the MASS SPEC right now, as you are well aware, cannot do its rotations. The people on the ground have identified the potential cause as a microswitch which has come out of spec tolerances just slightly. To approach would be for you to get the hammer and probe and a mini work station out of the CBS-A, and at the end of your MEB excersie on the MFR, to come around to the front side of the SPAS, to insert the probe into the microswitch and see if you can't bend the lever arm of the microswitch slightly to cause it to regain operational capability, over.
SPACECRAFT    Jerry -- to do providing -- that ought to be at the end of everything, and we are interested in holding the time outside the hatch, you know for planning purposes, down to about 4-1/2 hours or thereabouts, so we have a little bit of cushion. We'd also like to get a detailed description of where the microswitch is. I've seen the SPAS obviously, but I'm not quite sure exactly where it is. And would we be able to have, say, some sort of SPEC 219, or 220 up so the folks inside could tell when it got - that right, or would you do that from the ground, over?

CAPCOM    Roger, Bruce, we would send you a detailed message. The MASS SPEC is on the forward starboard side of the SPAS, and we'd be looking at the outboard side there of, at the top microswitch. You can reference page 7-8 of the Payload Systems Half Data Book and also we concur with your concerns on the time outside. We would limit the time such that if we were running long, we would not try to do the task.

SPACECRAFT    Ok, I'm up top side here now, looking out the window at it. You say it's on the outboard side, meaning the starboard side of the MASS SPEC.

CAPCOM    That's affirm, Bruce, we're dropping in and out, we should have Botswana UHF here shortly, continue.

SPACECRAFT    Ok, tell you what, work out a message and ship it up to us, and we'll do the best we can to work it in, in an appropriate priority, but near the end of the EVA.

CAPCOM    Roger, we concur with that, and that goes for the other contingencies we were talking also, Bruce, the camera and the velcro on the Cinema 360. We'll attempt to perform those only if it fits, and we don't exceed time limits.

SPACECRAFT    Yes, I think we'll try to do the 360 right at the beginning, because it's fairly straightforward. And on the camera, do you want to bring the whole camera assembly --

END OF TAPE
CAPCOM Roger, we concur with that and that goes for the other contingencies we were talking also, Bruce, the camera and the velcro on the cinema 360. We'll attempt to perform those only if it fits and we don't exceed time limits.

SPACECRAFT I think we'll try and do the 360 right at the beginning because it's fairly straight forward and on the camera, do you want to bring the whole camera assembly, pan and tilt and all, in or just the camera itself.

CAPCOM Roger, Bruce. The entire camera and bracketry we would separate at the plane of the 2 pip, the 4 pip pins and the electrical connector.

SPACECRAFT Okay, I copy. And I think as far as containing it in the airlock goes I've been thinking about it a little more. We can probably wrap it up in the lower torso bag from one of the suits and strap it down in there.

CAPCOM Okay, that's one possibility. We can also, we have a couple other procedures. One would be to use a couple wrist tethers and tether between the inner hatch handrail and part of the SCU paraphernalia up on top or we could use one of the APs if they're still inside.

SPACECRAFT Okay, why don't you give us a few options on that if you don't mind then we'll just pick whichever one seems most natural at the time.

CAPCOM Okay, we'll do that in a message this evening.

SPACECRAFT Roger, thank you.

SPACECRAFT Jerry, say again that page in the payloads systems data map.

CAPCOM Okay Bob. It's a picture page 7-8 and if you lay your grid over it such that the grid is facing the same way the picture is, i.e., the grid is at the top such that the windows are in the large double letter category then the mass spec would end up being --

SPACECRAFT Well we just put it -- Jerry?

CAPCOM Go ahead.

SPACECRAFT There's 2 black dots on the picture. Why don't you
CAPCOM  Roger, Bob. There are 2 sets of, or 2 dots. We would like the dots oriented such that the A goes across the top of the Westar in the picture.

CAPCOM  Challenger, Houston. UHF through Botswana.

SPACECRAFT  Okay, Jerry. We've got the dots matched and the windows are in the double letters.

CAPCOM  Okay, Bob. Then the mass spec is at the intersections of M and 26 27.

SPACECRAFT  Jerry, we're not hearing you at all. Please repeat or wait till we get you again.

CAPCOM  Okay, Challenger, comm check UHF.

SPACECRAFT  Okay, we hear you now. We didn't get any of that.

CAPCOM  Okay, Vance. The intersection of lines M and numbers 26 27 identifies the mass spec. We are talking about the outboard side, the starboard side of the mass spec and the microswitch would be the top one of the two that are oriented around the pivot point of the mass spec on that surface.

SPACECRAFT  Okay. Tell you what, Jerry. We got that pretty well down. I will have the EMU TV on things permitting and functioning and we'll go over there and we'll do our best and maybe you can talk me in on it real time, over.

CAPCOM  Roger, Bruce. That sounds good. We would probably be approaching the SPAS from the forward part of the cargo bay looking aft. The lever on the microswitch opens to that side.

SPACECRAFT  Okay, well write up the procedures and we'll have look at them.

CAPCOM  Roger that and turning things over to Mary.

SPACECRAFT  You give Mary all the good deals don't you.

SPACECRAFT  She's too small. Throw her back.

CAPCOM  She says somebody's too blue. And one last item before I jump off. Bruce, can you give us a status on the EMU water recharges?

SPACECRAFT  Say again on the EMU water recharge.

CAPCOM  Roger, Bruce. We'd just like a status on how all that went.
SPACECRAFT  Roger, they are both completed. I voiced down the percent of water I used in mine earlier. I don't know if Bob has his handy or not.

SPACECRAFT  Oh, I'll go get it, Jerry. It's downstairs.

CAPCOM  Okay, copy that, and Bruce, the numbers you read us were for your suit, is that correct?

SPACECRAFT  Correct. For mine alone. I did mine then we got into the Palapa ——

END OF TAPE
SPACECRAFT  Roger, they both completed, I voiced down the
percent of water I used in mine, earlier, I don't know whether
Bob has his handy or not. I'll go get it, Jerry, it's
downstairs.

CAPCOM  Okay, copy that, and Bruce, the numbers you read us
was were for your suit is that correct?

SPACECRAFT  Correct, for mine alone, I did mine and then we got
into the Palapa deploy, and -

CAPCOM  Okay, copy all that, and be advised we'll have one
or two teleprinter messages for up, probably for you at Hawaii.

SPACECRAFT  Okay, thank you very much. Okay, Jerry, which
numbers did you want?

CAPCOM  Oh, Bob, I guess we're just interested in what the
percentages on the tank were before and after fill.

SPACECRAFT  Okay, before fill they were 87.84, after fill
81.52.

CAPCOM  Copy those, thank you, Bob.

SPACECRAFT  Ended up with 11.8 psi in the EMU tank.

CAPCOM  Copy all that, thank you.

SPACECRAFT  Jerry, we got that heat pipe activated, we have 2
at 5+43 (garble).

CAPCOM  Roger copy that, 5 + 4 3, for heat pipe activation
and we're going LOS Botswana. Guam next at 06 + 16.

SPACECRAFT  (Garble)

CAPCOM  Challenger, you calling Houston?

SPACECRAFT  Jerry, just wanted to confirm, when we give a heat
pipe step 1 and 2 or just step 2.

CAPCOM  Stand by 1.  r, Ron, it's 1 and 2, Houston,
over.

SPACECRAFT  Glad to hear that. That's what we have, 1 and 2.

PAO  This is Mission Control Houston, at 3 days, 5
hours, 56 minutes, mission elapsed time. Challenger is passed
beyond the range of the tracking data relay satellite. We had
the use of the TDRS there toward the end of the pass. After it
was, the link was re-established when the ground station
problem had been giving us some trouble earlier, was overcome. Challenger about to start on orbit number 53. Crew was passed up some information earlier. About a contingency additional task to one of the EVA's where they would go out and repair the mass spectrometer. That would be, if they decided to do it, if it fits in appropriately with the timeline on the planned EVA, they would do it as part of one of the planned EVA. We're just about at the end of the crew's regular day's scheduled activities. They're on the timeline, according to the timeline, they're due to go into their presleep activities here very shortly. At 3 days, 5 hours, 58 minutes, this is Mission Control. Mission Control standing by for acquisition through the Guam station. This is a very low elevation pass, maybe only just a little communication through Guam.

CAPCOM Challenger, Houston, with you through Guam for 3 minutes.

SPACERACRAFT Okay, Houston, loud and clear. And I have a question, Mary, about the COAS cal.

CAPCOM Roger, go ahead.

SPACERACRAFT For one thing, it's not legible on the teleprinter message, how many marks. Is that 8 or 9 or, I can't quite read it.

CAPCOM Vance, that is six marks.

SPACERACRAFT Okay, and just a question, was the first calibration unsatisfactory or anything in doubt. I was just curious --

END OF TAPE
STSW-41-B AIR/GROUND TRANSCRIPT t168j 037:19:17 2/6/84 PAGE 1

SPACECRAFT Okay. And just a question. Was the first calibration unsatisfactory or anything in doubt. I was just curious or are several normal.

CAPCOM That's negative, Vance. The first one was good, though they're just trying to assess how that calibration may change as the cabin pressure changes.

SPACECRAFT Okay, very interesting. We're all surviving here in 10.2 very well. We haven't seen anything about the vehicle to indicate it isn't so far.

CAPCOM Roger, copy.

SPACECRAFT Mary, how far do we want to dump water tank bravo. I assume that's the one we want to dump this evening in presleep.

CAPCOM It'll be, it would be on the teleprinter we're going to send up to you. Sorry about that. Dump bravo to 20%.

SPACECRAFT Okay, bravo to 20% and we do have the teleprinter hooked back up again.

CAPCOM Understand, you have the teleprinter hooked up so we can send 3 messages to you.

SPACECRAFT Okay, great.

CAPCOM Okay, we'll send you the 2 messages over Hawaii.

SPACECRAFT (Garble)

CAPCOM Also, over Hawaii they'd like to run an encrypted pass so post Guam we'd like to request, after LOS Guam and you take your encryption select switch to transmit/receive and then after we lose you over Hawaii we'd like you to go back to bypass so we can pick you up straight through TDRS.

SPACECRAFT Okay, Mary. We'll do it.

CAPCOM And we're going LOS. We'll pick you up in Hawaii in 8 minutes at 6 plus 28.

SPACECRAFT Okay, copy.

PAO Mission Control Houston at 3 days, 6 hours, 27 minutes. We're standing by for reacquisition through the Hawaii station.

CAPCOM Challenger, Houston, with you over Hawaii for 8
SPACECRAFT  Roger, Mary. Ah but Hooter's in the window getting photography on this rev. See a lot of interesting cloud patterns out here in the Pacific.

CAPCOM  It should be real interesting cloud cover over the water. And Challenger, Houston. Vance, we'd like to verify that you have your encryption selections switch in transmit/receive.

SPACECRAFT  It is now.

CAPCOM  Also, would like to request that GN&C spec 1 so that we can change the variable parameter downlist so we can see the COAS CAL data and when you do the COAS CAL to your lower cabin press, we do not want you to update, we don't want to take those marks into the software. We just want to see the data so we can see if there's any change at 102 cabin. Also, the GN&C want you to know that your last COAS CAL, Vance, was one of the better ones they've seen down here.

SPACECRAFT  Okay, real good. Well we won't update then we'll just copy the numbers.

CAPCOM  Also, have one note on your presleep activities for cabin repress when you're ready to copy.

SPACECRAFT  Stand by —

END OF TAPE