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Good afternoon, this is a beautiful day for prelaunch press briefing. That coupled with the fact that we're going to launch this thing tomorrow, led us to bring to the podium, going from your left to right, Lt. Gen. James A. Abrahamson, who is the Associated Administrator for the Office of Space Flight at NASA Headquarters; Al O'Hara, who is the director of launch and landing operations for the Kennedy Space Center; Robert O. Aller, who is the Program Director of the TDRSS Program for NASA Headquarters; Leonard Gerkowski, who is the Vice President Engineering for Spacecom; and Major Donald J. Green, who is the Rain Staff Meteorologist for the Air Force here. And we'll begin with Gen. Abrahamson.

ABRAHAMSON The first thing I'd like to say is Happy Easter to everybody. As you can tell by the weather, we really are having a happy Easter, and we're hoping and expecting that this is going to be the case tomorrow. And in fact, Major Green down there, has guaranteed us that. I told him that if he doesn't provide a good weather tomorrow for us, he'll be Captain Green, and if does, he might be Lt. Col. Green. Actually, if you did count the earlier problems we had in the launch, and we don't discount those in terms of what they've meant and what we had to do about them, in terms of what it meant tor the program, and of course the two and a half months delay. But if you look at the count itself, what's happened at this point in time, we have a very very smooth count, and up until yesterday afternoon, actually, I think everybody was pretty bored with it. Yesterday afternoon, we did have two minor problems, one late in the afternoon, when a switch was inadvertently thrown on fuel cell number 1. And then there was in addition to that, a minor problem with one of the pulse code modulator units, and that's a very minor unit. And Al will mention, just very briefly, summarize those for you. But we're delighted, we think that we have just a fine situation for launch tomorrow. And in fact, the weather really is cooperating, and the only real concern is the upper level winds, and Major Green will comment very breifly on that, that situation even is getting better. So we're constantly looking ahead to the launch. Right now, the crew is getting ready, all four of them, to go out for a last T-38 ride, just to go out and relax a little bit with some acrobatics and they're in fine shape and mentally prepared for the mission. So we're looking ahead to a good mission.

Thank you. Al.

AL O'HARA Well, as General Abrahamson said, we did have a fine count, and we do have a fine count. The two problems that General Abrahamson mentioned, we consider minor in nature, the pulse code modulation master unit problem that was mentioned is merely a bit error that we had that toggled on and off a few times, and it has not reoccurred. There are two PCMMUs on the orbiter, and this one that did have the toggling bit is the

secondary unit; we will fly on the other one. We did have that unit turned on yesterday, the one that had the bit problem. It did not reoccur during hours of testing. So basically we put in a category of an unexplained anomaly and we'll do some troubleshooting after Challenger returns. It is of no concern at this time, and we're proceeding. The other problem that General Abrahamson mentioned, a switch was inadverterly thrown during the switch list portion of our countdown. If you have looked at the bar graph, you will have noticed that last night starting at 5 or 6 o'clock, we did some final switch list positioning in the Orbiter. And the procedure was correct, and it was just an inadvertent throwing of the switch during the running of that switch list. The consequence was that a voltage was applied across fuel cell 1, the fuel cell was not up at the time, and the, just to make sure that we did not have any lingering concerns, we had a telecon last evening with the vendor, with our experts at Downing and JSC. And the conclusion was, from all the people that are most familiar with the fuel cells, technical experts, that we do not have a problem and we are going to press on. We will of course, per the normal countdown, get into the fuel cell flow through test beginning at T-10 hours, which will occur about 1:10 in the morning. And then about 4:10 in the morning, at T-7 hours, we will be into the fuel cell activation. That will be our final point where will show ourselves completely that there is no problem. But, we're confident and as General Abrahamson said, the countdown has been very, very smooth. So if we picked it up last Wednesday afternoon at 2 p.m. We will rotate the RSS about 10 minutes after midnight per the timeline, and we don't expect to have any glitches. The last time I briefed you, I believe I did say we were going to have a 1 hour hold at 3 hours, we did extend that to 2 hours in order to assure ourselves that we could maximize the opportunity of getting off during the window. So we will have a two hour hold at 9, and the countdown bargraph does reflect that, the current one. I'd also like to remind you that the launch window has been extended to 30 minutes. JSC flight ops personnel briefed us at the L-3 day meeting on Friday, and the weather at Dakar is such that they feel confident that we can extend that window up to 30 minutes. So that's the timeline that we'll be working toward tomorrow morning. The crew is in the launch team, fire room in good shape. We're anxious to get back tonight at 10 minutes after midnight and pickup the count and add Challenger to our space fleet.

PAO Okay, thank you. Mr. Aller

ALLER Thank you. I can't tell ya'll how happy I am to be here. I've had reservations every weekend since January to get this bird off. We're in great shape. As always happens in these programs, there's always some little glitch that comes up close to launch. We had a little concern on a gyro early in the week. We have that concern no longer, and we're in good shape.

I'm so confident Abe, that everything's going to go well, I'm leaving for Houston this afternoon.

PAO Okay, thank you, Mr. Geokowski, did you wish to say something?

GEOKOWSKI Okay, on terms of detailed status of the spacecraft, we are sending our telemetry that's coming back from our spacecraft through the Shuttle to our backup control center here at the Cape, as well as to our main ground station in New Mexico. Both stations are continuously monitoring by computer, the status of that information, everything looks good, and we're ready to go.

PAO Thank you. Major Green.

GREEN Yes, we have a high pressure system building into the area today, it's going to give us a super day for the launch tomorrow. We'll have mostly clear skies, and good visibility, winds will be out of the southeast around 10 knots, and temperature at launch time will be in low to mid 70s. The weather at the abort landing sites is also looking good. Edwards is forecasting mostly clear skies out there with visibilities unrestricted. Winds will be out of the northeast at Edwards about 15 knots, Dakar is looking good, they'll have scattered cloudiness and also they'll have easterly winds, unrestricted surface visibility, they'll have some haze below 10,000 feet. The only place we're a little bit concerned about right now is White Sands, they have a front and associated low pressure system moving through that portion of the United States now that's giving them some strong surface winds, 30-35 knots, and are getting some blowing gypsum. We expect that funnel system to be out of the area and the winds tomorrow about 20 to 25 knots and the visibility forecasts, from our forecasters out there are seven miles. In the local area aloft, we had three balloons go up this morning, one at 7:30 and two at 9:30, showing that the winds, max winds over us right now are about 119 knots. This is continuing to advect out of the area and our launch forecast for the upper level winds tomorrow are between 90 and 100 knots. In summary the weather at the launch site and the landing sites are looking good. We'll be under the dominance of high pressure, it'll be hot and sunny here and a good day for launch.

PAO Okay, thank you. We're ready for questions here at Kennedy Space Center, and then we'll go to the other centers. First over in this section. If I don't call on you by name, please identify yourself and your organization.

ALBERT SALISDID (BALTIMORE SUN) In connection with the reference to Dakar, I was under the impression that you only needed, that the daylight was the determining factor, but it says

in the morning briefing report that also the weather is a factor, could you explain that?

Surely. We've had one of the flight crew, Ron Grandy over there, flying in the, there's an Air Foce C9 that goes over, provides medical personnel, and also gives us an opportunity to fly missions each time. The weather in that part of western Africa is such that there's often this low haze, and we are of course, concerned with the visibility, although Dakar and the strip and the configuration of the strip is such that it really stands out for a high approach, a high angle approach. What Ron has done, is he's flown missions out there every evening, and of course, there is no lighting at Dakar at this point. Therefore, if once we get beyond dusk, then we can't really make a visual approach. Although we do have now some Navy pappy lights that help with the approach itself. It turns out a very interesting phenomenon with that dusk layer, that the 15 minutes after sunset, they really have had quite consistently a little better visibility than they've had before. But that visibility layer is usually a low altitude layer. And again, from a high angle approach, that hasn't been a problem as we've flown it with the C9. Run will flag one more mission, about an hour or so before the actual lift off time tomorrow.

BOB BOZOLE (NBC) General Abrahamson, you've answered before, but we just want to ask one more time. Are there any lingering concerns, any problems, any possibilities of any problems with the engines that had the leaks before?

ABRAHAMSON Well, let's see. We have spent so much time reviewing those engines now that I believe the way most of us within the agency and within Rocketdyne now feel is that we know more about those engines than we actually knew on the three engines for the Columbia on the first flight. Of course I didn't participate in that, but that's the way people have characterized it. We have gone back through every material discrepancy and examined that, examined all of the records. We did find again some minor problems, and in fact again took the conservative course, and in one case changed out an oxygen line when it was not clear from the records that we did have a full proper inspection of that, on that particular item. So I think that we all feel very comfortable about these particular engines. Of more importance is what we've learned and how we apply this for the future. I know I've said this lots of times, but none of us ought to be in this business, if you're not willing to take a problem and make it into an opportunity. And that's of course, what we really try to do. We have devised a series of improved procedures and perhaps the most dramatic is the improved procedure that we'll now use between every flight on the stand to checkout the machine and satisfy ourselves that we do not have a leak. And that particular procedure we developed and validated during the second flight readiness firing. And we feel that we

have enough confidence in that particular procedure that we didn't have to do a third flight readiness firing, and still are able to in fact, ensure ourselves that we have a very, very tight engine. So, but that's only one amongst the whole series of procedures. Other procedures are improved acceptance tests and then a lot more discipline and sensitivity in the manufacturing test as we go through looking for leaks in areas that we didn't expect or didn't look in the past. So I think that we're turning this problem, of course I'm paid to be an optimist about it. I think we've turned it into something that'll mean a great deal for the Shuttle downstream. Two and a half months is not a great deal of pay now, for a safe flight now, and to assure that we get mission reliability later. Later on, had this problem developed, and impacted us when we were flying every 3 or 4 weeks, it would have been a major impact.

PAO Jay Barbery, NBC.

BARBERY General, I have a 3 part question. First of all, if you get a good mission, will you be able to make your five missions this year? If so, could you outline the schedule of those 5 missions for us? And do you have any reservations whatsoever about bringing 7 back here for the first landing near the Kennedy Space Center?

ABRAHAMSON We're aiming for all five missions. And from a launch turnaround viewpoint, we think that we can do that. And we've instituted some differences in the way we'll be working, but it will be very tough. It will be around the clock operation, actually with four shifts as opposed to three, to ensure that we can make that operation run. The toughest one will be the turnaround after 6, and going to 7. And we're aiming for about the second week in June for that 7th flight. We're aiming for about the first week in August for the 8th flight. And that should put us in a comfortable position to shift in and use the Columbia for the 9th flight, which is a very critical Spacelab. And that's scheduled for the 30th of September, and we've maintained that schedule. So from a launch viewpoint, while it is optimistic in it's type, we have a plan, we think that we can support that. The toughest and the real unknown for that 9th flight, and of course that's an important one to us, is the ability to get two TDRS spacecrafts up, have time for those TDRS to drift over into proper position, be fully checked out. And then the first one check out not only the spacecrft but also the ground station. And I'm sure, Bob, you would like to comment on this. But the toughest part of that timeline for number 9 is the TDRS timeline as opposed to the launch timeline. So one of the things that we're doing is that we are planning now, a backup single TDRS Spacelab mission. And that's going on with the principal investigators and primarily at the Marshall Spaceflight Center. And the key question is, can we get efficient science return and get sufficient science data, so that that's a viable

mission. And that hasn't been answered yet. The Landing. No we feel comfortable, Crip was willing to take that on, and you know, we're landing on a hard surface here, isn't any worse than landing at the hard surface at Edwards. And since Edwards, unlike when I was stationed there, seems to be a lake all the time, we don't feel bad about that at all. The only limit for that will be since we have not gotten the crosswind landing, that we would like to have, we will limit it to a lower crosswind situation. And we think that time of the year, in June, that unless there's thunderstorms or something in the area which would be another reason that we wouldn't come in here. That the wind situation would be a fairly benign one. And therefore, we don't feel uncomfortable about coming here.

BARBERY Just to follow up, real quick. If you should run into any problems at all out there this week, after Challenger's in orbit, you're not going to hesistate to bring Challenger in here, is that correct?

ABRAHAMSON Yes, that in fact is a backup plan. Major Green commented about weather at White Sands, in spite of the lovely title that we now have of Space Harbor, I don't ever want to go there again.

SHERR (garble) I think this is probably for Al O'Hara. We have been told during the last debriefing this morning and then in the release yesterday, that everything was going absolutely smoothly, there were no problems, and now we find out there were two, albeit minor problems, that there were some minor problems. First question is how come we didn't know about it sooner? The second is, apropos of the fuel cell, what would you expect to find tomorrow morning at those critical times to completely satisfy yourself, if there were a problem?

O'HARA The two problems that were mentioned here came up late last night, and I think Norm Coffin briefed you all this morning, I don't know to what degree he was involved in the discussions last night, I really don't know. And as a matter of judgement about, you know, whether it's a serious problem or not, or of any consequence. Again we consider these both very minor problems. That perhaps is the reason Norm did not go into it in detail. When we bring up the fuel cells and load them, at that point in time we'll know whether or not there's any build up in the cells that might cause a problem. It's the electrolysis problem of a very minute nature like molecules that might be there because of the reverse voltage that was applied last night. And we're going to, General Abrahamson had a meeting a few moments ago with our technical people, we're going to do some more reviews with the vendor when they arrive to discuss it further this evening. We did one thing, I neglected to mention earlier, we are going to activate the fuel cells about 1 hour earlier in the count. The timelines I gave you there are the

flow through starting about 1 o'clock, we're going to try start as early as we can after we come back from this break, which will be shortly after midnight. The purpose of that is to gain total confidence in the fuel cells before we go into the locks and hydrogen loading of the Orbiter itself, and that's the reason for that. But again, we do not expect a problem.

SHERR Just to follow up, worst case, what would happen, it could knock one of the fuel cells out?

O'HARA Well, the absolute worst case, which we don't expect, would be a fuel cell problem that would, you know, could cause you the fact to have to replace the fuel cell. But that is an absolute remote possibility and we certainly would not expect that, and don't expect that.

Carlos Byars

BYARS Now that we're onto Challenger with three good engines, you made the number modifications between Columbia and Challenger, we're looking downstream to more shuttles, more engines. Have you planned any other modifications to these engines, and if so, what and why?

Good question, Byars. Well, you know that we've now restricted engine operation to 104 percent. And my intent in restricting it to 104 percent is to ensure that we put as little demand as possible on the very meager spares that we do have and we'll be in this situation where we just flat don't have many spares at all for a little more than a year. After that time, some of the investments that we began to make last year will begin to, the hardware will be coming out of aligned, and it'll be a much better situation. So we will be operating at a lower percentage of operation. The first time that we think that we might need 109 percent is when we begin to go into polar orbits out of Vandenberg. So we're still aiming that we would have that 109 percent capability about that point in time. Even so, I have allocated money for a review of some of the troublesome parts in the engine development program. And that's to go back and to look and see if some redesign is warranted to give it higher confidence that we can operate at that 109 percent level for longer periods of time. You know, right now, there are, we have certain bearings that we don't particularly like, we do change out, or we go in and inspect the oxygen pumps at intervals that we don't like. So from a maintenance viewpoint, even though we feel that we can reach 109 percent, it's not the operational configuration that I'd really like. I'd like it to survive a lot longer and it's never going to be an airplane engine, but I'd sure like to push it in that direction a little bit further. So, we are going to be careful for a period of time, and at the same time, look at the life limiting parts. And we'll be making

investments in some of that redesign to see if we can improve that maintenance situation.

PAO Dave Dooling from the Huntsville Times.

DOOLING Jim, two questions, first off. If the fuel cell were to be lost on orbit, how much of the mission beyond TDRS deployment would you attempt? And secondly, in your experience in Aerospace Engineering, have you ever encountered a cluster of unrelated but frustrating problems croping up so close together in a program?

I'd hoped you would have asked that of Al, Dave. Al do you want to comment about the fuel cell.

O'HARA Well, there are three fuel cells, and the flight ops folks at JSC of course, are the ones that do the flight planning. We would not lift off you know, we would not continue with the count if we had a bad fuel cell, when we bring it back on the line.

DOOLING If it's in orbit...

Yes, we haven't made that judgement yet. I'm sure that what you're going back to is STS-2. At that point in time, we didn't know very much, obviously about the fuel cells themselves. And therefore, when we had the fuel cell problems, we took a very conservative approach and brought the mission in early. At this point in time, I think we have a lot more confidence in the fuel cells. And while I can't predict at this point, know exactly what we would do, or I'm not willing to commit at this point. I think that the situation is different than STS-2. So depending on when it occurred in the mission, what the characteristics were of the kind of failure, and then of course, what our technical analysis of the problem might be. So, all those would be factors.

DOOLING Excuse me, about the having failures cluster, or problems cluster so closely together in unrelated.

These are not, you know these kinds of problems, are quite typical. This is a complicated vehicle, and during every count, we have a few problems and yesterday the fellows were sort of waiting around, waiting for some little problem to happen so we could get management involved in it. You know we like to keep them occupied while they're here. But really, these kinds of problems are typical. I said at the meeting a few minutes ago, these problems sort of brought us up to the norm. You know, we normally have a few little troublesome problems like this that we work. So this is not unusual at all.

So now, you're talking really about these things that have occurred in the last count . . .

Yes, well you were talking about the bigger picture. . .

You were talking about the engine problems right?

DOOLING I was referring to the engine problems coming together so close together in time.

Where there's an aerospace myth about problems occurring in the sets of three. But frankly, I haven't run into them this close together, all being this frustrating, all in one subsystem like this. But I do think what it represents, Dave, curious answer here, it represents a kind of a blind spot in the program actually. In a really increased sensitivity to a set of problems that people just flat didn't think could occur. And that's why I'm so pleased that in fact, if it had to happen, that it happened now rather than later, so we can erase that blind spot, and that's what I think we've done.

PAO Reggie Turner, BBC.

TURNER For General Abrahamson. I wonder if you're a hundered percent confident about the space suits. I did hear, I don't know whether it's right or not, there'd been a problem with Musgrave's suit during the final checkout, and that they've, the backup suit has been switched for him as the prime one.

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ABRAHAMSON That's a very minor issue and in terms of Story's suit, we did switch it because it was easily accomplished and its not anything significant. Now are we confident of the suit. Remember the suits are really getting their first checkout in a sense, it's kinda like we're beginning the real, in the Air Force we call it operational test period. And unlike the Shuttle itself who's had many flights and been operated that way, its a little different. And given the fact that we did have the problems before, I thought it was a wise thing to do to put in a back up unit, in terms of the unit that has the most problem areas in it, the hard upper torso. Fortunately, both Story and Don are about the same size, so that was very easy to accomplish. I beleive that number one, we have spent enough time, again, reviewing and understanding the suit problems that even, and particularly with the extra unit onboard that we feel quite comfortable to be able to have a successful EVA. Remember we want to get both of those guys out there. I will say one more thing about the perspective however. I believe that the Shuttle is one of the very important characteristics of the Shuttle is that it is a man and woman vehicle. And that the flight crew is there and able to apply the capability of a person on the spot doing things and that means both inside and outside the vehicle. So I am anxious that we begin to get more experience on EVA. That experience, this particular EVA mission set itself, the objectives that they have are not critical. What's important is that we get out as soon as possible, that we checkout the suits that we find what kind of limitations that the people will encounter working with the Shuttle and get that experience. So we'll still be very conservative. If there were another problem, we'll be very conservative with the suits. But my intent is to get that practice and build up the experience.

TURNELL That would seem to suggest that if necessary, one man will go out alone.

ABRAHAMSON No, that goes against my being conservative rule.

PAO Martin Dean, CBS

DEAN Just to pick up there, General. Will one man go out alone if there's a problem with 2 suits or one or the other astronauts?

ABRAHAMSON We have talked about that and haven't come to a final conclusion. It really depends on what the problems with the suits were and whether or not we could place somebody inside the airlock and be able to go out. Unless we had access with 2 people, I would prefer not to go out with 1 person alone, unless of course it were an emergency. So we needed that person out there.

DEAN Okay, and Mr. Ohara, in that this is a first, and I

was just wondering in the back room, whether there is any degree of tension that was similar to the other first when the, just before the Columbia went up or is it all just old hat.

O'HARA No, it never gets old hat. I think the team is anxious, fortunately we had this break that we could give them a rest. A lot of people have worked a lot of long hours in the engine world and I think we're ready to go and anxious to see Challenger fly. This is not the 6th launch, this is the 1st launch for Challenger, so all of our people are, I'm not, it's a little different than the 1st flight of Columbia, obviously, but its a new vehicle and our team is realy anxious to see it fly for the first time. We're ready to go.

DEAN Tension, or anxiety?

O'HARA No I don't think so, I think they're confident, They've done alot of work in the last 2-1/2 months and I think we've got confidence in it. We're looking forward to the mission not just the launch, its going to be an exciting mission to follow and we're anxious to get it on its way tomorrow.

PAO Okay, we're going to take one question before going to Houston. But we'll be coming back. John Wilford, New York Times.

WILFORD If for any reason you're unable to launch, to deploy the TDRS, would you continue with the full mission as planned now, including the space walk?

We haven't discussed that, my opinion is yes, that's the way we'd do it. But remember we have 3 opportunities to launch the TDRS and provided the TDRS itself is in good health we would like to try all 3 of those. Bob, would you like to make any comments about this.

Actually there are 4 opportunities, Abe. 3 on the first day, and 1 on the second day. Because I've used the EVA workstand in the upper part of the bay I'm, I don't know a great deal about the EVA activity on this mission but I would see no reason it couldn't be conducted in that area without being tangled up with the payload in anyway.

As you can see we have one of our customers here whose going to be very sensitive about it. We have to keep our customers satisfied.

PAO Okay, we're ready to go to any questions in Houston. Jules Bergman, ABC.

BERGMAN I have a two part question. One for Abe and one for Al O'hara. The first part is for Al O'Hara. Do you really

consider the Shuttle operational after the troubles of the last 3 months, and then I'll ask the question for Abe.

O'HARA Are you trying to set me up? Nice try, Jules. Yes, We consider the Shuttle operational from our view point of the systems issue and we've tested these systems through the first flights, 5 flights. We certainly do consider it operational and we see Challenger as one more step down this operational path. So yes, the answer is yes we do consider it operational.

BERGMAN And as you are going to find out now, Al, I was not setting you up. Abe, if you were to characterize the way you feel now after the grief and hysterical moments, that's a media term, of the last 3 months, what would you say?

ABRAHAMSON Yes, that was a media term, and I'll leave that to you. I won't comment on the hyterical, Jules. I'd first like to offer an editorial comment on what Al said. My, I guess if I have any real specialty in the R&D world, its bringing systems into operational status. And I've been fortunate enough to be able to participate in a space system, missile system and an airplane system, so I have pretty broad experience. And going operational is not a gate that you go through, a single gate that is something that at one point in time, you're magically annointed operational and then you're there. Not by any means. First of all there is the level of maturity as a hardware that has to be achieved. And my judgement is that we still have some maturity that we have to acheive in the Shuttle, in terms of the hardware. Perhaps even more important than the hardware itself is the maturity of the team that is behind that hardware. And its the readiness of that team to solve problems. And If I look at that, and look at just how well this whole team has responded, the NASA team, the contractors that are behind them, regardless of what the faults were in the first place, but how they responded to solve the problems, then my judgement comes down on the side of being operational. Because they did do just a fabulous job, and if you had lived through the last few months as we have, examining the engine, solving the problems, pinpointing them, finding them. I think you would all share some of that confidence that I have. Now what was your second comment?

BERGMAN My second question, not comment was, if you were to characterize your feeling now after the grief of the last three months, to eliminate my media question, how do you feel?

ABRAHAMSON I feel ready to go. And good.

PAO That's all the questions from Houston. Coming back here again then, I think this gentleman in the middle of this row had his hand up first.

COLLINS Reid Collins at CBS, General, how are your philosophical feelings about the lack of a real 3rd flight readiness test firing. The commander of the mission has said that he sure would like one. Would you like one.

ABRAHAMSON No, I think that I commented earlier. Let me describe this test just a little bit. In the second flight readiness firing. We didn't know where the leak was and we had to say, my gosh, how are we going to solve this thing? There were several theories. One overall theory was that the leak was ouside in the sense that there's just a Dantes 7th level of his inferno, I think if you describe what that really is outside. And there's a lot of water that's being ionized. And of course there is also hydrogen that is not fully combusted that is also out there. And we did have a hydrogen leak, if you recall, on both the first and the second one. It was down in the bell or the nozzle of the machine, so one of the theories was that there was a wave of hydrogren being forced in through the outside, inside the aft compartment. The second theory is of course that there was one or more leaks inside. And then we said how are we going to determine this. We thought the first thing we had to do was change the pressure situation and by changing the fundamental pressure inside the aft compartment, and looking then at the hydrogen concentration over time and comparing that to the first firing that we could tell if it was outside or inside. But we took on another challenge, and if you think about whats going on in the inside there, you've got a huge purge going on inside this closed compartement. It's sort of a hurricane inside of that and what we did is we tried to produce a model of what that looks like and then say Okay, with that hurricane going how can we pinnpoint a leak coming from one of the engines and generally what that area was. So we set up a series of mass spectrometer input on tubes at different places inside the aft compartment. Then we made the firing itself and we recorded the time history of the hydrogen concentrations in each of these positions. But afterwards what we did is we put a little control pulse of hydogen, I'm sorry helium, back through each of those inputs, and then saw how that changes that pattern and what we were really able to do was refine our model of what a leak concentration, where it would come from and what the time history would look like. Though with the aide of that, we now feel that within about a cubic foot or so, we can probably predict any reasonably detectable leak back there. Now that gives me a great deal of confidence. Remember the reason we did the flight readiness firing in the first place was structural soundness as well as leak testing. Since we demonstrated twice the structural sounding, and I didn't want to do that again. I felt very confident that with this test we now have a leak situation that we can understand. So I feel very comfortable with that. Its kind of a long explanation, I'm sorry about that.

COLLINS I appreciate that, but you have had other modifications that you did and you have not fired the engines in place with the current mods that have been achieved. I was just wondering if you would feel more comfortable if it's a matter of time constraint, money, aereon, what really makes us want not to do that?

ABRAHAMSON Well, all of those are real. I can't say we just ignore those things. But, if there were a level yet of discomfort anywhere amongst the experts that have looked at this or amongst our ownselves and certainly I assure you that every one of us take this absolutely as our final responsibility that we have four lives that are going on that ship. And in addition to that, we have the treasure of the nation and frankly the hope of the space program going on every time. If we had any real lingering doubt about that we wouldn't do it. But we now really feel that we have a very workable test, one that, as I indicated, we'll put in every, between every flight. And we have confidence in that test and we proved it by comparing it to an actual firing.

PAO Bob Gazel from NBC

BOB GAZEL This is a minor point, but I want to go over it. If on the 4 opportunities you don't deploy the satellite, on this mission, can you land on the runway at Edwards or do we have to, heaven forbid, go back to White Sands?

ABRAHAMSON We can land at Edwards.

PAO Craig Covault from Aviation Week. And after Craig's question we're going to go to Marshall for a second and then come back.

CRAIG COVAULT Abe, on the suit, Abe. It is my understanding that the problem that caused the switch of Musgrave's really hard upper torso for his suit is believed to have been a power supply spike out of the Orbiter. I also understand it can be cleared relatively easily. That's what they found up in the Orbiter. If you get a similar spike on either of the two suits in orbit would you plan to clear it and proceed and secondly, since that suit that did get spiked is now the backup unit. Do you consider the backup to be a 100% viable backup or a slightly subset backup?

ABRAHAMSON Well, slightly subset backup obviously. But, the point is that that particular unit, for some reason, seems to have more susceptibility to a spike and that doesn't mean that it won't work. It just means that that the prudent course is to change and use one of the other systems that did not experience that problem at the time. A lot less trouble.

PAO Go ahead, Craig, follow up.

CRAIG COVAULT And back on the power supply side of the Orbiter. It is also my understanding that Columbia's power supply had some undesirable characteristics as well and you thought you were over them with Challenger. What are you doing in the program to make sure you've got power supplies compatible with suits in the airlock?

ABRAHAMSON I don't have that answer. That isn't done yet. It's clearly one of our action items that we now have to proceed with. Right now we've been concentrating on the mission, Craig, but we will have to do that obviously. And look at how we proceed with that. The backup, in this case, is fairly simple. you just use the battery in the hard upper torso and that's a good strong capacitor and solves the problem.

PAO We're going to Marshall for a question there.

TOM KNIGHT WAFFTV HUNTSVILLE Wanted to ask you a question relative to the jet stream for Major Greene. The, right now, you've stated that the jet stream has approximately 120 knot winds. How far north does that have to move above the Cape before there would not be any affects on the Shuttle?

MAJ. GREENE It's not really a case of moving towards the north. What we have inside the jet stream is a core of maximum winds. And that core is moving through the Cape area now. That will be moving along the jet stream to the east of us. And from all the progs that we have and from all the secure models it is indicative that it will be out of the launch area for tomorrow's launch.

TOM KNIGHT You're not expecting any problems relative to bad times. There's not going to be any wind affecting the launch at all?

MAJ. GREENE Well, we're forecasting any winds for you at 45,000 feet to be about 90 to 100 knots. And the winds people down at Johnson will do a load analysis on our ballons and determine whether it's go or no go.

TOM KNIGHT How late in the evening could you delay to make that decision?

MAJ. GREENE At the real time we continually put up ballons through the final 24 hours of count and at the real time operation, every time we put a rawinsonde or a gymsphere up or a windson, we transmit that data down to Johnson and they take a look at it and do their loads analysis and do their computer model on it. So it's real time and we have ballons going right down to T 0.

TOM KNIGHT Thank you.

There was a night salute by PJ and the rest of the crew to all of you.

PAO We're moving over to JSC once again. And they have one other question there and then we'll come back here.

JULES BERGMAN ABC This is for Major Greene or Al O'Hara I think. What is the actual jet stream sheer limit you can take on the six point stress points on the wings of the Orbiter as I understand it? And how quickly does the real time computer judgement come back from JSC?

MAJOR GREENE The way I understand it, I'm not an expert on the model, is that there is no critical value that I can tell you that we can go or no go. It's all according to where the max winds occurs and what the sheer levels around it are. It's a pretty complex model and in order to get the answer for that you have talk to the JSC winds folks down at Johnson. We are forecasting the winds to be within limits that we anticipate that are near the normal for April. And more or less that is what they have loaded into their max loading program. But there is not one value that we can say that if it's above that value we can't go or if it's below that value we can go.

BERGMAN What I'm really asking Al O'Hara then, I guess, is how close do you come to the acceptable value or to the no go value tomorrow based on Major Greene's forecast?

AL O'HARA We get the go/no go from JSC, Jules. The data it takes, I believe, 90 minutes to process the data at JSC for gymsphere. And as Major Greene said we send the data out and then 90 minutes later we get a report back of go or no go. So I don't have this, it's a complicated program that is run at JSC and there are no absolute values you can look at and draw that judgement.

PAO That's all the questions from JSC. Okay, we're ready for a few more questions here. Lynn Sheer had her hand up first.

LYNN SHERR ABC I've got one question that might require a couple of different answers from different people. First, Mr. Allerd I think. If Challenger should not be launched tomorrow how long can the TDRSS stay on the pad with the battery situation before it has to be changed out and then General Abrahamson, could you just run down what the constraints, when's the next time there would be a launch?

ALLERD Our capability for launch are 5 consecutive days starting tomorrow. We did get a 3 day window because of battery limitations and we extended that a couple days ago to five because of the temperatures we've been experiencing have been a

little cooler in the pad. So we have a 5 day window. The IUS had a 6 day window. So from the payload standpoint we're in good shape.

ABRAHAMSON Lynn, you're going to force me to put my glasses on but I'm going to try to not do that. (Laughter) Matter of fighter pilot's vanity. I might be forced to. (laughter) I give up. The IUS comes actually on the 8th. We have both the TDRSS battery and the cryoload limit. On the 9th we have an IUS battery replacement required. And clearly what happens if we have to go to that IUS battery replacement time, it's going to be a major recyling. It'll be several weeks. So there it is.

LYNN SHERR I'm not sure I'm clear. You're saying the 9th day or the 9th week?

ABRAHAMSON No, on the 9th.

LYNN SHERR 9th of April?

ABRAHAMSON 9th of April, right, on Saturday.

LYNN SHERR In other words, tomorrow's the 4th, so you could launch every day until the 8th without a delay after tomorrow, is that correct?

ABRAHAMSON That is correct, but remember there are also other weather problems and it also depends on how close we get right up to the actual launch and whether or not we have, in fact, made all the loadings in terms of the time for our turnaround.

LYNN SHERR In other words, before the fuels are loaded, we're talking about these. It could be every day until the 9th.

ABRAHAMSON Al, why don't you add a comment about that.

AL O'HARA Well, that's basically it. If we get down where we start running APU's, of course then we have to look at how much ground time we have available and then get them to the 24, 48 hour situation. So down to that point in time we can go any of the five days.

LYNN SHERR And just finally, over the next couple of weeks, what happens, if in fact you got little gliches every day, does that, my understanding is the window gets shorter and shorter as you go down the line.

I might kill myself. (laughter) Not serious.

Basically, it gets larger every day. I'd like to make that correction. It gets just a few minutes or seconds wider each day, is my understanding.

We're at the minimum wedge right now. It broadens a little bit as we go into the summer.

MARK KRAMER CBS General Abrahamson, when NASA first received the Shuttle program, one of the thoughts behind it was to have a rapid turnaround and you've seen in this early stage of the program that that's going to be difficult if not impossible. I know that you've extended the length of time you expect it will take to turnaround that given vehicle. At the same time you talked about a payload and equatorial orbit of about 65,000 and 32,000 in polar and I know you haven't reached that yet. Is it realistic to assume that you ever will reach those specs with the Space Shuttle without major redesign?

ABRAHAMSON I think it is. In fact, we'll get a pretty good demonstration of a fairly fast turnaround. Not what we expect or hope for at the very end, of course, but a fairly fast turnaround right now between 6 and 7. As we're aiming for a landing on the 9th and then turning around by early second week in June. And as I indicate that will be a challenge for us but we're willing to take it. We don't see any reason why we can't get the 65,000 lbs equatorial here and we, in fact, have several options. Remember, we're also developing a filamentloncave. We're developing that in order to get nearly 5,000 lbs of improved orbit capability, to lower orbit capability out of the west coast. If, under the very worst of circumstances, we were forced to delay so that we couldn't, for some reason, we didn't want to bring the engines up to a full 109%, and we don't see that at this point, but if that would happen. We also have an option here out at the Cape to launch with filamentloncave and get what would amount to very nearly 5% of engine capability that way as well. So we think we still have, we're approaching all of those problems in a broad front and have several options to get there, so I'm not lacking any confidence that we can't get there.

FRANK CASENDA TODAY I have two questions for Al O'Hara and then one for General Abrahamson. First question's due to fuel cells. If worst came to worst and you find you had to replace that malfunctioning fuel cell, how long would that take to do and the same thing, if another gliche turned up with the mass memory unit how long would that take to correct?

AL O'HARA The fuel cell, of course, is a long pole. We haven't laid it out. I would estimate it to be like a two week hit would be off the top of my head. The PCMMU issue, the unit can be replaced if you can tie it to that unit. There are many pieces of hardware in the circuitry there that could cause this so the problem is we don't want to go in and change a piece of hardware unless we are certain there is a problem with it. So we don't intend to change it out, but it's like an hour's, it's an hour type issue not a day issue.

PAO Bell Anobe, I'm sorry.

FRANK CASENDA I had a few more questions. I, first of all, Al O'Hara, the weather we were told earlier on Tuesday didn't look very good. Is that still the prognosis for Tuesday or is it?

AL O'HARA No, Major Greene said the weather's improving and looks like it's going to be later in the week, the last I heard. Is that correct (garble).

GREENE Yes sir, Tuesday is looking good if we have a 24 hour slip, there's another system affecting White Sands now and indications that'll be here Wednesday or Thursday. But Tuesday looks good.

PAO Okay, we're going to limit people now to one question. And we have three more people to go. And Gary Ballenoff is the next one.

GARY BALLENOFF CHANNEL 2 I'm confused I think, General. A couple of people down here, including at least one congressman, have said that there is the decreasing confidence factor on down the line in potential Shuttle customers as meant that the flights on down the line won't be able to keep up with the original manifest. And I was wondering if that was, first of all, true and if you've heard of any Shuttle customers who have given up or at least delayed their plans or made plans for aereon and flight instead of flying on the Shuttle?

ABRAHAMSON I am delighted you asked that question. There was a defection of approximately 5 customers that in the very early day, people thought were or hoped at least, were going to go on the Shuttle. In those days, and this was back in the 1976, 77, 78 timeframe, there was a Shuttle, I can't call it a manifest so much as a mission model, that had a very active buildup rate and of course, was expecting to have the first flight in 1979. When that slipped and finally ended up slipping into 1981, there were customers who could not be served and even worse than that, some of the expendable launch vehicles that they would have planned on earlier, nobody had made the investment in those so they had no option really expect to go aereon and they did go to aereon. I think we would have expected that most of the European countries that are a part of ESA and participate in the aereon development would go there. But these were some American satellites as well as the INOFET 5 series, two of the INOFET 5 series. So there were some defections but those occurred early in the program. Now in addition to that, one of the things that has caused the Shuttle mission models some difficulty is that the U.S. government launches were over booked. Department of Defense did, I think in a burst of optimism back in those early days, schedule a large number of flights and in later on budgetary limitations and just the reality of launch on demand, those kinds of issues

caused those to be decreased rather substantially. And in addition to that, NASA has reduced some of their own Spacelab flights that they intended. So the sum of all of those meant that one of the early things that Mr. Bates could do and do realistically and properly in my judgement, is to reduce that mission model and he did so. We now have a mission model that is building up through approximately 30, 31, 32 flights by 1988 and that's a very achievable mission model. Now since those early defections we have, in fact, added commercial contractors to the Shuttle. We have been signing up new customers throughout this time frame that we have been on the ground. So while some of those customers are kind of watching anxiously obviously to see that we solve the problem, how we solve it and what we do about it and what that will mean to them. They have not defected. So therefore those comments that have been included in our testimony and then, I think, interpreted by others, really apply to the longer frame of time and are not, they just don't apply to what's happened in this two and half months that we've been on the ground. In fact, I think we've done some fairly effective marketing and you'll see all of that over time here shortly.

PAO Reggie Turnell, BBC.

REGGIE TURNELL BBC Back to the mission objectives. One of them is to triumph to motion sickness test. If these tests are in fact successful and do induce motion sickness under the new rules are we going to be prohibited from being told the results?

Well, it's my hope that these new mission rules will in fact open up the flow of communication. If you recall, the first step about that mission rule is that we're not going to hold what we have always previously done, regularly scheduled medical conferences. The mission commander, it's his responsibility to say if there is a problem that has a mission impact and provide at least some kind of a summary statement. And that will be on the open net. You'll all hear that. So that is the first objective. There's some kind of a mystique, some terrible thing associated with this. Every navy in the world has solved the problem and we're going to solve it too. So I would hope that we would keep the NASA tradition of open discussion at least to the maximum extent possible and that the first half of those procedures are to do that. So you'll hear those kind of comments. Now, when it comes down into the amount of medicine that such and such took, or the color and the consistency of the vomit is, which I objected to very strongly on some of our other conversations here, we're going to deal with that privately cause I think that is something that ought to be left between the patient and his physician as opposed to becoming a matter of great discussion amongst the press. We'll tell you if there's a mission impact and we'll tell you if there's a problem. But we're not going to discuss all of these personal things that don't need to be discussed.

PAO Okay, thank you very much. We'll see you all at launch.

END OF TAPE

PAO Good afternoon. Flight Director Jay Greene, the ascent flight director here to discuss today's happenings. Jay.

GREENE Okay, I understand the immediate interest is in what was recorded as some sort of insulation problem on the OMS POD. You said the TV of it is not a heck a lot of detail you can get from it but speaking to our insulation people the damage whatever it is is aft of the new blanket that was put on to cover the OMS POD. It is not the new blanket. It appears to be in the forward lower corners of the nomix blankets that were carried by the Columbia in the same locations. It appears that the nomix blankets are lifting up in the corners in two spots and the preliminary analysis is that it should be no problem. Some further words, the area is rather a cool area. Max expected temperatures are on the order of six hundred to seven hundred degrees. That area and that's a surface temperature that I just gave you. That area covers a graphite apoxy structure. Worse case we could expect to see some local overheating. Perhaps some minor local damage but nothing to cause any great threat to the vehicle. The area that we're talking about is what's know as FRSI. That's FRSI and FRSI stands for Flexible Reusable Shuttle Insulation. It's a nomix felt in the area we're talking about. It's a nylon with a sylicon coating made to take high temperatures. That's a reasonable summary of what people know now of course they're looking at the TV pictures and we'll get further details as we get more time to look at the data. But I guess the big word to pass along is that there is no imminent danger of any sort or any threat to the vehicle.

PAO Why won't you go ahead and give us a summary of the shift and we'll have a little bit of questions.

GREENE Okay, I guess as most of you know when we started this shift, the big problem we were worried about was the structural loading due to the winds that were around in the launch area. We had a very fortunate occurrence in that the winds cooperated perfectly. We had virtually no load exceedences, we had no problems from the load point of view and the decision was made to launch. We had one trade that we had to make as you know we would have liked for our AOA sight to have used the lakebed landing if we had to perform an AOA. The lakebed was nominally chosen to be Northrop Strip in that Edwards Lakebed is no longer a lakebed, it's a lake. Northrop when last I heard had gusts somewhere in excess of 25 knots and light snow so we opted to go with Edwards, the Edwards way was acceptable and during the precount we passed the word to the crew that Edwards 04, the concrete runway out there was our nominal selection if we had to do an AOA. Ascent we got off on time, ascent performance as best was can tell was as predicted. And the exact things that contribute to ascent performance still have to be analyzed. For example we have to look at how the engines came in relative to spec. We took a small hint on the Columbia performance wise.

It's too early to tell what the Challenger engines did. SRB's and other contributor appeared that they might have been performing about the way the past SRB performed but that too won't come out in the analysis as we press on. During powered flight I guess you picked up on the air-to-ground. We have one avionics bay fan shutdown. We switched fans, each AV bay have 2 fans, we're running on the second fan in AV bay 1, it's running perfectly. We don't anticipate any further problems. When I left and during the TV transmission that I'm sure you all watched, IUS checkout was in progress and everything was proceeding nominally with no anticipated problems. And that's about how the shift went. It was a very quiet calm shift and the CAPCOM's were remarking for the first time. They had one flight note that we passed to the crew and it didn't sneak it's way into the system until just before we handed over to the orbit team.

PAO Okay, we'll go to questions. Please identify yourself and your affiliation. Any questions here? Over here, Paul Reecer, Associated Press on the second row here. Raise your hand please, Paul.

REESER Associated Press Regarding the loose thermal insulation is there any possibility that the astronauts could get a look at it or perhaps during the EVA?

GREENE I haven't discussed with anybody the plans for the EVA and if there will be any modifications so just looking at the location it looks like you may be able to get a better perspective. We almost got an edge-on view of whatever it was from the TV and obviously if you get a guy out in the bay or 2 people out in the bay and they're in that area they can get a better view than we had on the TV picture.

REECER Okay, so is the timeline such that they would have the opportunity to do that during the EVA.

GREENE I'm sure that they'll be some thought given to working that into the timeline.

REECER Okay, and second question. Was there a private medical conference today?

GREENE No sir.

MAX RIZLEY Galveston News I just want to clear up a few little tail end things I heard here. First off, was I wrong or was there a slight delay coming out of that last hold, that's the first one. Second one if you could just elaborate on the message they had earlier that there was the left OMS engine failed its gimbal check and I guess that's about all I got.

GREENE The left OMS engine, we did - the crew does a gimbal

check, we do a gimbal check between the first OMS maneuver and the second OMS maneuver over the Dakar tracking station. We did that gimbal check. The GNC, the guidance navigaton and control flight controllers looked at the gimbal check and everything appeared nominal. We did OMS 2, OMS 2 was what can best we described as a perfectly nominal maneuver and P.J. reported that they did a post burn gimbal check and the secondary gimbals on the left engine failed that gimbal check in 2 axis, both pitch and yaw. When he did that gimbal check unfortunately we didn't have any contact with the vehicle. To do another gimbal check we would have to mode the software from the orbit coast mode which is OPS 201 into what we call OPS 202 the maneuver software programs that are resident to the onboard computer. Instead of asking the crew to take time out from their timeline we opted to wait for a playback of the gimbal check that Paul did on his own and when I left the room they were still analyzing that playback. What it means is we lost a secondary part of the - let me correct that - we had a funny with the gimbal check on the secondary TVC of one of our 2 OMS engines and if it came to the worst eventuality and we lost it, we still have the primary system, it's operating perfectly. And in all probability we had a funny with the cell test, and we'll discover that during the playback.

RIZLEY Let me just get it straight. It was then a backup system that failed?

GREENE We have a primary and secondary TVC system on each engine. It was the secondary system and as opposed to fail it didn't pass cell test.

RIZLEY Yeah, the secondary does that mean backup, the main one that ...

GREENE Yes sir.

RIZLEY One other little thing. Could you give us some - are there any other preliminary times available for launch and all the little details?

GREENE I didn't bring them with me. I'm sure they can be provided. If you go with your nominal times, their golden.

RIZLEY And about the delay I mentioned on the hold. What was the reason?

GREENE I don't think there was a delay.

RIZLEY Just a few seconds. Something about the booster officer had a question or something.

GREENE Yes sir.

GEOFFREY LEVENWORTH Time Magazine I noticed on the air to ground there was some discussion of the operations recorder number 1. Could you explain what happened and is that recorder now working okay?

GREENE We had a - the OPS recorder number 1 stopped, just flat stopped. Our communications people fiddled with it a little bit. They sent some commands to move the tape in the mechanism. They got the recorder working. It is now working perfectly nominally. We don't understand what caused it to stop, we'll continue to watch it and if required, work around any problems.

LAVENWORTH Also, I also heard something about a depressed trajectory on takeoff. Can you elaborate on that.

GREENE Somewhere right after max-g just watching where we plotted relative to the nominal we noticed dispersions that were similar in size some of the dispersions we've seen on past flights. Ordinarily we wouldn't even pass the call but the crew is seeing the same indication onboard his own displays and just to let him know that his guidance is working well. We passed a call to confirm what he is seeing is a valid sorce of data. Following the first stage trajectory we also make a call, we make a call relative to how first stage went. Whether we're nominal or below nominal on performance that call went up nominal which indicated that we had at least nominal performance, probably a little better than that.

DOUG MILLER KTRH Could you explain, what is a depressed trajectory? Can you just briefly explain that?

GREENE A depressed trajectory in this terminology meant that the flight path angle, the angle of the velocity vector relative to the horizontal in this case was lower than the preplanned nominal. Which meant that we were picking up some lower altitude profile as we went up during first stage.

DOUG MILLER Was that significant?

GREENE No sir.

DOUG MILLER Also, what can you tell us about the engines on the Challenger itself, how they performed. Realizing, of course, you don't have the final data in and so on, does it appear that they performed as you had wanted them to?

GREENE Yes, as a matter of fact, during the ascent, a booster engineer came to me and he reported that all the temps were running somewheres on the order of 20 degrees or less of where they were predicted by the Marshall folks.

DOUG MILLER We heard them mention, talking about the 104% figure while they were going up, what do they have to say about that? Did you catch it?

GREENE I'm not sure I know the reference. Normally we fly at 104 and the only thing they may have reported is, during first stage of flight control, the max dynamic pressure, we go through a thrust bucket. We throttle down to somewheres on the order of 81% rate of thrust and then after we finish the thrust bucket we come back up to 104.

DOUG MILLER Did this appear to hit 104 then?

GREENE Oh yes.

DOUG MILLER Alright.

MIKE MITCHEM GANET Can you tell us what happened with Musgrave's suit, I'm not clear on what the problem of that is? I believe there is something wrong with his EVA suit, is that correct?

GREENE Yes, they'll have that information in the query desk out there, I'm sure. They're using the backup suit and it's some minor funny that's wrong with it.

MITCHEM Were the SRB's picked up normally?

GREENE Last I heard they were sighted on the surface. I

don't know where they stand in the recovery procedure.

PAO Jules Bergman up here.

JULES BERGMAN ABC NEWS Jay, there's been all kind of strange references which because of poor audio I have not be able to make out about the TDRS. Is it working normally?

GREENE Yes sir.

BERGMAN It is.

GREENE At least when I left everything was going OPS normal. People were very happy with the progress of the checkout.

BERGMAN So deploy will be on time as of now.

GREENE Yes sir.

PAO Okay, let's go to the Kennedy Space Center for questions.

PAO Identify yourself please.

DAVE DOOLING HUNTSVILLE TIMES Has Weitz said anything more about the crud that he said he got on the window of booster separation? Do you know if definitely there is more material deposited there or maybe it was just a different lighting angle?

GREENE I'm sorry, could you repeat your question?

DOOLING Has Weitz said anything more about the crud that he got on the window at booster separation? Does he generally have more than was accumulated on past flights or was he just hanging at a different lighting angle that may have made it look worse?

GREENE I personally didn't hear him make any report of that window coating. I can't answer that question.

I heard him make one report about something getting on the windows at staging, I think. But he has not to my knowledge said anything more about it and I don't know how you evaluate it compared to any other flight at this time.

PAO KSC got more?

KSC Got one more question? Go ahead.

For instance, we missed the reference (garble) I believe to the problem with Story's spacesuit. Could you repeat that?

GREENE There was a question about a problem with Story's spacesuit, I believe it was in reference to a problem that occurred several days ago at KSC. There has been no problem with the spacesuit today. And I believe this reference is to an old problem that surfaced where you are four or five days ago.

PAO Is that all at KSC? No more, okay. Are there none at Dryden, okay. Any more questions here? Okay, this gentleman back there.

JOHN HARTZ CHRISTIAN SCIENCE MONITOR Could you just give an overall characterization of this liftoff compared with past flights?

GREENE It was about as nominal as we've ever had, I think. We had some minor disturbances but the count was flawless. We got off on time. Our real time data followed the nominal as close as we've seen. It was good.

MITCHEM GANET Similarly, can you describe how the crew is doing overall?

GREENE Here on the time line or slightly ahead, they seen to be performing admirably. Doing very well.

PAO Jules?

BERGMAN ABC NEWS Jay, does today's performance of the Challenger on this it's first flight, and what has happened since during the flight and the crew's performance convince you that the Shuttle system is well on its way to being operational?

GREENE I think we've had a few small problems. Certainly less than would cause any concern. I think the answer to that is yes, Jules, that we have a good vehicle on our hands.

BERGMAN If the rest of this flight goes untoward with no malfunctions. If they get TDRS off and they do the EVA and they land safely, of course. Will you then be willing to say that Challenger is operational?

GREENE Well, Challenger is operational because we're flying operational flights. Interspersed with the operational flights we'll be doing testing as time allows and I don't think there's anything about what we're doing now that leads you to think it's anything other than operational.

BERGMAN Well, isn't this the first test flight of a new Orbiter though?

GREENE Yes sir.

BERGMAN A new Orbiter that is lighter, with more powerful engines. I don't think in some context you could call that operational.

GREENE Well, but the lighter only works for us. It allows us to lift more weight and the new engines, well every time we fly we're going to test the new engines to this 104%. And if today is any indication, the new engines worked admirably. They really worked good.

PAO Anything else? Okay, thank you very much.

END OF TAPE

PAO Well, good morning everyone, let me introduce the panel here to you. On my right is Harold Draughn, Flight Director, the Flight Director for STS-6, next to Harold is J.J. Conwell, the Payloads Officer for the offgoing flight control team, and to my extreme right Lt. Col. Ralph Torino head of the IUS program office for the Air Force. I guess its pretty obvious to everyone what a complex mission STS-6 has been, involving TDRS and the IUS and an EVA introduced into the mission relatively late in the planning and training process and of course the process of bringing out a new vehicle as well, all of which constituded a substantial burden to the lead Flight Director and the smoothness of operations has in large part been a tribute to his managerial skills and that of course is Harold Draughn. Let me let Harold begin by briefing you on how his shift went tonight.

DRAUGHN Okay, I'll give a brief summary of those anomalies or those events that happened during this shift that were not associated with the IUS-TDRS deployment and then I'll come back and cover those events that were associated with that particular exercise in some detail in chronological order. And if I don't elaborate on some problems that you heard about over the loops or if you want some additional information or if you need some fill in from one of the previous shifts then just speak up and we'll try to speak to that. I think that you probably heard about the startracker self-test fails that we had early on in the first IMU part of the first IMU aline. We had anticipated some problems with the self-test of the startrackers pre-flight, the self tests bits had been erroneously being set on occasion in the pad testing. That did show up in flight, we went ahead with the normal procedures for the first alinement and indeed were successful in getting a 2-startracker aline, if for some reason you lose one of the startrackers, its a fairly simply procedure to use just one of those trackers and which would have been a fault down logic. That requires that we do one more attitude manuever to get the other star measurement, but that would not be a problem. In addition to that today we did do a COAS calibration, with the COAS instrument mounted in the forward cabin, when you can mount it on the forward one or the overhead. Today we did a COAS-CAL to get the alinement errors or zero out the alinement errors with the mounting in the window, in the forward window, and that was successful also. And that would serve as another backup to the startrackers. There was a report of about midway during this second shift, an observation by the crew, when they were looking at the aft end of vehicle on the starboard side of the vertical fin, they noted some ice build up. The ice buildup was, in discussing it with the crew some more and referencing them to some onboard charts that we have and their counting tiles, and trying to locate exactly where that buildup is. It turns that we're fairly sure that they're coming from the APU water spray system. Dick Truly heard that discussion while it was going on on the air to ground and brought

some slides over that he had in his office. He had seen exactly the same phenomenon on flight 2, and indeed, had a picture of that ice buildup. I sent those over to the photolab and we'll have some prints for anyone who wants to see them in the morning. But those are from flight 2. The OPS recorder problem, we had a OPS 1 recorder on, I think Jay Greene told you about that coming off shift, the OPS 1 recorder stopped recording, stopped motion early right after launch, or soon after launch. We dumped that data and it was not a very good quality, but after doing the dump, we were able to put it in a record mode again. It has been recording data successfuly since that time. When it got back, it went back to the end of travel and it came back and when it got to the same position on the tape again, it exhibited another anomalous performance. It jumped tracks to a different track, not just an adjacent one but jumped tracks again and changed directions, but it continued to record so there's something wrong with the OPS 1 recorder but it is still functional and we are continuing to use it. If in the event that we do wind up losing that recorder, we still have the other OPS recorder and we can complete, do the flight with just that unit. The left OMS TVC, during the gimbal checks, the crew reported that they had failed the secondary gimbal checks on the left OMS engine. We have since, we repeated that thing about 3 times with the ground watching it during window checks. The ground controllers have since found a 20 amp spike on a power bus that feeds the power supply in that unit, that power supply gives you power to both the pitch and yaw TVC gimbals. Looks like a single point figure could give you that, we have the ability to reset the RPC, the RPC is something like a circuit breaker, that we could reset that circuit and reattempt to power those units back on. Final decision on whether or not to reset that circuit breaker or the RPC has not been made, I'd like not to do it prior to the OMS SEP mainly because we really don't have to do that. We don't have to reset it yet and we had not had that, I felt, adequate time to fully weigh the pros and cons. There's a lot of other very desirable gear powered by the same bus that powers this particular circuit and even though the RPC ought to pop again if the anamolay, if the short or whatevers going on is still there, there's really not enough justification to reset that unit on that short a notice. The planning team tonight will weigh the pros and cons of resetting that and perhaps we'll reset it prior to the deorbit or prior to one of the rendezvous burns tomorrow. The, we still have full capability in the fuel out of the left OMS on the primary gimbals, and of course, if worse came to worse, you could always use the left OMS and the right OMS engine so we really aren't anywhere near having a real dilemma on our hands with that. It's just a lose of some redundancy. The temp controller, you may have heard discussed on the loop some, the crew putting it in full hot that's just something that we have learned from previous flights I think we have discussed with you each time the crew comfort, they generally get up and adjust the thing a little, they get a little cool, and they adjust a

little bit warmer, but then when they go to sleep, they turn the lights down and various equipment like the CRT's get powered off and there's less heat being pumped into the system and after sometime after they go to bed they wind up getting very cold and waking up and having to readjust, so we went ahead and put that thing in the full hot position just to get a lag on the thermal trend that we know is coming just because of the way we'll be managing the systems going into sleep. We've got 2 APU's that have a small leak in the APU CO cavity drain that's what's present on I believe flight 2. One of the previous flights has had a leak in that system also. There's no procedural implications and no safety implications from that anamoly and we intend to not to do anything as a response to that.

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DRAUGHON Payload bay cameras the crew at one time had lost the zoom out capability on the payload bay cameras. We were zooming them in for them and then they would zoom out, they would zoom them back in when they needed them, and we were working how to correctly or best optimize the cameras for the deployment and sometime during that procedure, they managed to fiddle with the switch enough to get it to working again. And as far as I know, it is still functioning for them. Story, after the deployment, requested permission to go ahead and do the EMU 1 top off this afternoon, because he was still; Story requested permission to go ahead and top off that EMU finish. And that really amounts to a completion of the water charge, we didn't launch it with a full load of water, that was approved and that event was accomplished. That was something that was supposed to be done on flight day 3 in the afternoon. He was just keyed up enough, or excited enough from the spillover from the IUS deploy that he didn't want to go to bed yet, so we went ahead and did that. As far as the deploy went, it was an awfully successful event, involving a whole host of people. The main challenge, I think in that, was keeping all of the elements tagged up as I think you all are aware, you got involved in this thing four elements really, you got a POCC or Payload operations control center at Sunnyvale, in California. You got the TDRS OPS control center in White Sands, and of course our control center here, and another element being the crew on orbit. And the main challenge from my point of view, was to keep all of things in sync, if you can focus all of those talents on the right problem and keep everybody in sync. There's probably not very many problems you can't solve. Some of the idiosyncrasies that we ran into on the; you may have heard some discussion about a signal presence looking at the TDRS receivers. And that was merely an indication of how the TDRS receivers were locking up to the carriers. It was a little different than the signature that we had seen in the pad checkout, it was nothing functionally wrong with it as far as our capability was concerned, every indication was that both the A and B strings were operating but we had to apply modulation and remove it and then reapply it to get the full lock on that system, but it performed normally. On the star scan, star scan is an attitude alignment sequence that the IUS is capable of doing to restore an attitude reference, and you would use that particular capability if on a particular flight you happen to have some problems with the payload bay doors, the IUS has a builtin safety feature that it'll power itself down and lose its attitude reference to keep from thermally overtemping when you don't get the doors open on time. We wanted to do a functional demonstration of the star scan sequence on this flight, just in case on some future flight we might encounter such a problem and need that software and that's why we're attempting to do the star scan. We did the star scan sequence consist of three sweeps or three scans, celestial sphere scans to look for the two stars that are required to complete the scan. The first one you do, and if you don't acquire the stars, you pitch up and do another

one and then pitch down looking for the star, and as you pitch up and down around where you think it was. They did not acquire either star on the original scan, they pitched one direction and acquired one of those stars and we did not have sufficient time prior to sunrise to do the second raster above the nominal, and you have to do that on the dark side, or do it in darkness. So they didn't have time to do that. And the star scan, since we had not had a power down on this flight, was an optional task to complete, and so we did not have to go in and delay a rev, which it would have cost us to do to go ahead and do the other raster, and complete that star scan sequence, so we didn't do that. We had a great deal of discussion on the loops about the vector comparisons that were going on. I think some of that was attributable to exactly what vectors we were comparing, what times. The way that sequence works, is that we take a vector here in Houston and integrate it ahead to a particular time that Sunnyvale is going to get to capture the IUS downlink vector and read a vector at a particular time and compare it to one that we've already integrated ahead and given it to them. In that process you can see that how we update our filmers here by taking a tracking data would have a marked effect on the accuracy or the apparent change in that comparison technique. I think we've learned a little bit about keeping those things in clear focus while we're doing those comparisons. But the ones that were done towards the latter part of the run, were quite acceptable and gave us no real problem. The one problem that we did have, and I don't think we fully understand yet, was associated with the IMUs or the strap down attitude control system, or reference on the IUS. There are five IMUs onboard, and a redundancy management system quite similar to what we have on the Orbiter to revoke redundant components. And if you are familiar with our IMUs you know that we must establish thresholds at different levels. And anything below a certain level, you don't measure because it's probably noise, and then when you know you're going to do it, a particular kind of translation, you elevate that again to make sure, like if you're going to turn on OMS engine, you don't need to count little bitty dips, or little bitty counts, little bitty accelerations, you know you can set the thing up at a thousand micro g's and when an OMS engine comes on, you going to trigger that level. So we adjust those levels depending on the kinds of things we're trying to sense, and when we're just humming around through orbit, there's no sense in having those levels up to power, which we can wait down so we can catch small drifts, and small errors in the sensors. The IUS has a system similar to that, and I'm not as familiar with it as I am with the orbiter, but it has one similar to that. On two occasions, once predeployment today, the RM on the IUS loaded out two of the RIMUs and put us down to three sensors. Statistically and analytically when you prior to flight, three RIMUs, spec performance on three RMUs was adequate to meet the inconditions that the TDRS needs for getting to geosync. So we knew where we were as far as achievable capability, assuming that those last

three units were within spec. The problem that was bothering I think all of us, was the fact that two of them got voted out. Either very close together or at the same time, and making sure that we understood where we were and that it was safe to proceed that we weren't going to have a similar problem happen with the remaining three.

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DRAUGHON And we've given quite a bit of thought to optimizing the amount of redundancy and we have in the vehicle because of the flight time after deployment all the way up to geosync, and you may indeed have a valid failure later on and we had concluded preflight that given sufficient justification we would stay in deorbit long enough to take some reasonable measures and restore redundancy. Sunnyvale wanted to make sure we really understood where we were with the IMUs before deployment and we pushed that right up to the limit I think at the Hawaii pass prior to deployment of about 9 and a half hours. And making that assessment they decided that they thought that the RMUs were good and that all five sensors were in good shape but had been inappropriately voted out. They took command action to restore those sensors to the redundancy management software and that took, they made that over GTS I believe, and gave us that go at Hawaii at about 40 seconds to LOS, so we got that call to the crew and away we went and deployed on a nominal sequence everything was very normal there. Their RM system again voted two units out, I don't know if its the same 2 or not, but it voted two of the five units out again prior to SRM 1 plus postdeploy. So that's still an unresolved issue and that's as much as I know on it. The deploy was on time, SRM 1 was on time, it was, burn time I'm told, was slightly less then the nominal but well within spec. The SRM burn is targeted to be a little short and the RCS burn to tweek that off much like we trim our maneuvers with the other crewmen that all went per the book. SRM 2's scheduled at 16:15 and I'm not sure what time it is now as far as MET and I think that everything is GO as far as we can tell with the IUS mission at this time, it was when we left the Control Center. So with that I'll answer any questions you have or whatever you like.

DRAUGHON Questions, Craig Covault?

CRAIG COVAULT (Aviation Week Harold) Did the IUS motor fire with all five gyro?

DRAUGHON No, just 3. SRM 1 you mean? Yes. With just 3.

COVAULT And what's the situation for the second motor firing these? I'm not that familiar with the IUS, do you have the second, or is there an issue there too?

DRAUGHON (garble) speak to that but they had not concluded that when I left so I,

No, we've haven't come to a conclusion as to whether we'll attempt to restore the two gyros that went down. And they were the same two that went down predeployment and with the three gyros we have we could make the mission spec basically with it within the 3 sigma errors. So we're examining our data and to make sure we understand that the, anomaly has the same

signatures before and then we need to sit down and talk with the TDRS folks and us and decide is the mission we can give them good enough and will they accept that versus the risk of trying to restore the two additional IMUs, now that evaluation is going on right now.

CARLOS BYARS (Houston Chronicle) I'd like to follow up on Craig's question a bit. I'm not sure that I understand exactly the situation, but is it that you have, the IUS 5 with 3 working gyros, that's correct?

DRAUGHON That's correct..

BYARS appropriate term? Instead of 5, and the TDRS people don't know for sure whether you're going to be able to park it in the right place. If I understand it, it's going to park somewhere.

DRAUGHON No, but it's just as much like our IMU RM with voting 5 systems against each other, you can come up with a better answer then you can with just three. There are ways of mapping failures intc other planes and axes and you can come up with a better answer. There are some risks in any situation with restoring failure faulted off on hardware. So you've got to weigh the disadvantages of messing with the configuration versus continuing on with something that you know will meet spec.

BYARS What was the feeling of the TDRS people about going ahead with firing the IUS knowing that you only had 3 gyros going.

DRAUGHON We can't inhibit that far. Okay, that was not a choice, but our basic system design was, and it's a requirement, that with the 3 gyros we can make our basic mission spec, so that's something that we have in our hip pocket, with respect to wondering what we really have to do to restore the additional two gyros. All I can say is, that we're looking at the data both at Sunnyvale and here and in Florida to understand and get a judgement as to the health of the 2 gyros which are down and the health of the 3 gyros which are up. And if I were to lose one of the 3 gyros that were up, my software automatically brings all five gyros back up and then they will go through a software routine which would look at the fault protection indicators these thresholds. And if those two gyros are really good and they were inappropriately tripped off for some reason then we would be back on five for the remainder of the mission. That's basically the status and right now we still have a spec mission as far as we're concerned. Paul Recer?

RECER Are those gyros used after the satellite reaches geosync to maintain stability?

DRAUGHON No

RECER They aren't. So they're only used to get up to...

DRAUGHON Only used to get up there.

RECER And that's it.

PAO John Bisney, way in the back? And after John we'll reconfigure and take questions from KSC then we'll come back here to Houston. John

JOHN BISNEY (RKO) Harold do you have a new Orbiter, the first program use of the IUS, 3 rookie crewmen, and probably the most complex deployment you ever had. Are you surprised things went this well for you?

DRAUGHON I was expecting a few more nuisance kind of things, little things nagging at you, and there has been, you know we had a few of those on flight one, and with the new vehicle I expected a few of those, I expected more instances of heaters that weren't quite in the right range, regging in the quite range, and we've got one of those. On of the best stopping heaters is regging a little hotter than normal and on one of the passes next to the last one before we left there we changed to a different set of heaters with a different set of thermostats on them in hope that it would reg a little lower, so its a mix of getting the heaters placed exactly where you need them in the thermostats, so that you don't wind up running heaters with thermostats in some other place or having the wraps wrong. You expect those kinds of things with the first time out, and I frankly had expected more of them, it has been a very clean ship, very clean ship.

PAO Let's go to Kennedy Space Center, Florida and take questions there and then come back here to Houston.

DOOLING (Huntsville Times) For Colonel Torino to start off, how short was the SRM burn and how much did the, how long did the RCS have to burn to make it up?

TORINO The SRM 1 burn was 2 seconds short, it was 148 seconds versus 150, the RCS burn was, I think, I'm sorry I can't hear you, 13[illegible] versus 93, something like that.

DOOLING Okay, are you getting the telemetry back properly, I understand that the the IUS from the T34D last year lost its telemetry, are you getting it properly on this one?

TORINO Yes so far, we're getting the telemetry.

DOOLING Okay, Harold on the fuel cell that had that accidental voltage during the countdown, have you noticed anything nominal in its performance so far?

DRAUGHON Absolutely none and it was brought online a little bit earlier in the precount and its performed exactly according to spec.

DOOLING Okay have you gotten any thermal data from the OMS pod that had the insulation hanging out?

DRAUGHON There's not been any response that you could measure there. The blanket that appears to be pulled out, are it looks like, there is a natural breakline on the blanket coming around the starboard side of the pod there and it looks like there are two edges that have peeled up just slightly just about 4 or 6 inches or so, and that stuff does half, like a half an inch thick, and under that is the sip. The sip itself is good for withstanding temps up to the 4 or 500 degree range...

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DRAUGHON itself is good for withstanding temps up to the 400 or 500 degree range. We expect that particular area to see around 700 degrees during entry. You'll get some local hot spot on the graphite apoxy, there's no problem, but you would not expect to see any response or any kind of signature, even if we had instrumentation immediately in that area while on orbit.

DOOLING Okay, excuse me, and the crew is scheduled to deactivate the latex reactor about 5 hours after launch to stop the prelaunch turning, did they get that done?

DRAUGHN Yes, they did.

PAO That's all from KSC. Okay, anything further from here in Houston? Craig Covault again please.

COVAULT I think a good one for the payloads officer would be how you juggled the major elements today because going into it that was as Harold said a pretty tough challenge. Any examples on well it worked?

CONWELL Well, the, I thought it worked very well today. The simulations helped alot because we had several problems and we had to fit them all together and I think the team really came together well today and made quick decisions when they had to. We had some problems we had to redo things at different passes, but we got the job done in time to get off on the 8 day deployment.

COVAULT Was your IUS gryo situation, the one calling up the most interaction between everybody?

CONWELL Yes, it and the state vector problem, which we took a little while to iron out. It all kind of fit each other. Finally got a handle on all of it and decided we were go.

COVAULT I'm not sure I understand your state vector problem. Did I miss something there?

DRAUGHON The state vector problem is what I discussed earlier, it had to do with integrating the ground vectors from the orbit determination here in Houston. I had two specific times when we know that later on Sunnyvale is going to have telemetry and can capture a time homogeneous vector from the IUS downlink, and then do a vector compare to see how good the relative states between the two vehicles are. So its just a way of making sure that the IUS has got a good reference on it. And there are times when we have to transfer these integrated ahead vectors to Sunnyvale ahead of time. Which means that we anchor on a vector here in Houston, and then integrate ahead, and transfer those times out. Then later on we'll take in more tracking data and we update our (garble) here, so our yardstick

keeps changing, if you will. And its not always a common denominator that your comparing it against. When we finally got around to looking at the relative errors in the IUS as they mapped into similar errors in the orbiter when we had not updated the orbiter as opposed to comparing it to ground accuracy, because they are not the same unless you update continually. And when we started out in business that way, everything started to fit together.

PAO Paul Recer.

RECER Was there a private medical conference today?

DRAUGHN No there was not.

PAO John Bisney, again in the back.

BISNEY In view of today's busy and I suppose rather tiresome day for the crew, how would you characterize their activities for tomorrow, what sort of a day will they have.

DRAUGHN They have a fairly ambitious day tomorrow, we purposefully, you know the CEFUS experiment is a very high priority and it is scheduled on flight day 2. And its full, but it's not the frantic kind of activity that you can get into when you're keying so much activity to ground passes. The difficult thing, one of the difficult characteristics of the IUS-TDRS deploy sequence, the host of thing that have to be done with the ground. The CEFUS is truly autonomous onboard and the crew can run that thing so they have alot more flexibility and working around it and integrating it into their routine. And when we'ver got to anchor things to being in the right attitude, being with the right combos, that's what makes it tedious and very difficult to manage.

PAO Carlos Byars

BYARS Harold, earlier you were going through a general part of the briefing, I'm not sure I grasped the signifcance of something here. You were talking about, I believe, with the problems with the gyros, and something to the effect that Sunnyvale decided that all 5 were good and to go ahead with the launch and the crew got word about 40 seconds prior to LOS. Did I get that right and, does this mean that the crew infact got a GO, NO-GO on the launch, about 40 seconds before it would have been too late, or what?

DRAUGHON No, Carlos. What we tried to do there was, there was already and always has been a one mandatory event in the deploy sequence, that occurs over that Hawaii pass, prior to deploy and that is a successful demonstration of a two way leak with the TDRS. S-band up and telemetry down. That has always

been a mandatory objective at that site. And todays sequence, the primary thing that the Sunnyvale folks were trying to determine was that they understood the implications of the RIMU behavior and that the fact that 2 of them had gone off or been voted out in close proximity was not a generic thing that was eventually going to get some more of them because as Colonel Torino said 3 is adequate but 2 is not so we wanted to make sure that we really had a firm grip on that. The way that story came together we had a GTS pass, which is a Sunnyvale side of the Guam station and they had some work to do there and not a whole lot of time to look at the results of that work. At GTS they were commanding these RIMU's back on line, back into the RM scheme that had been voted out and they wanted to look at that and assess the success of that before they gave us a go for deploy. We still had this thing to do with TDRS at Hawaii and right after GTS comes at Hawaii pass so we weren't at all sure that they would be able to finish their RIMU evaluation. We went ahead and made the assessment on the TDRS, and told the crew they were go as far as the TDRS check was concerned. That decision tells you what attitude to go to for Santiago, the next station pass and on to deploy check, deploy-attitude. So we passed on that and we fully expected not to get word on the RIMU evaluation until after Hawaii LOS, in which case we'd have had to get to them at Santiago pass and tell them there, and JJ that's what 10 minutes before deploy?

CONWELL About 16 minutes prior to deploy.

DRAUGHON So they'd have been in the right attitude we'd have asked them not to pull the umbilical, and not to go to internal power so they wouldn't have been using the IUS batteries. So it was just trying to optimize all our bets.

PAO Yes sir, and you are

DICK HOGAN, Science Digest. Is there any truth to the rumor that this IUS was dropped in integration procedures? By about 3 or 4 inches? That's the number I heard.

DRAUGHON Beats me, I have heard of no such incidence.

CONWELL There was a handling incident at KSC, but I think dropped was too strong a word. I think that the vehicle settled along with the TDRS 1.2 inches in (garble) it was in what we call a J-hooks on the payload handling device and a procedural error occurred which allowed, when the weight was taken, was allowed to be taken by the J-hook, it wasn't properly locked if you will, and it settled 1.2 inches. We took a very careful look at that and so did the TDRS folks to see if any kind of stress or damage had been done to either the TDRS or the IUS vehicles, and we came to the conclusion that nothing had occurred.

HOGAN The obvious question I have is mechanical misalinement of your gyro packages or something like that.

CONWELL No, but we have tested it many times after that particular point in time.

PAO Carlos Byars.

BYARS I believe you had mentioned earlier that you had seen this same sort of I'm not sure if the word failure would be correct, but a problem with the gryos, previously. Is that correct?

CONWELL No, the first time we saw it was on orbit today.
BYARS Follow up to the previous question, this procedural incident. What you say it was allowed to settle. How rapidly did it settle?

CONWELL I can not say....

BYERS It doesn't float like a little feather, I'ver seen it it goes...

CONWELL I really can't answer that, I don't know how much time it took. But the first

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CONWELL I really can't answer that, I don't know how much time it took. But the first reports came out that it was dropped, and after it was looked at, the determination was that it settled because it was the not properly sending for the hydraulic pressure to take it. And so it didn't do this, it did this. Now the question is, is that a drop, is it a settle, or what is it? We looked at that data, and did a structural analysis on the vehicle and the TDRS and we satisfied ourselves that there was no damage done.

Was there an estimated G loading during the settling?

DRAUGHON I can't recall what it is, Sid do you recall what it was?

SID It was not.

CONWELL I don't recall it, it was some time ago. This occurred, how many months ago?

It was before we went into the orbit, I don't know when it was.

CONWELL Yes, first time, we could get you that data, but I don't recall it right off the top of my head right now.

DOUG MILLER (KTRH) Paul Weitz had said that he believed whenever the TDRS deployment happened, the 95 percent of the mission was complete in his mind. Would you agree with that assessment?

DRAUGHON It's certainly a super objective on this flight. As I said, the CFES is a very high priority DTO with, and carries on between, what was it flight 3, or 4, that we started flying CFES on, and it goes on for several more flights, you get into the production mode. So that is no small part of the program's commitment. But there's no doubt that the IUS TDRS is a major, was the major part, and is the major part of this particular flight. There are implications not only for all the other guys that are committed to the use of the IUS, but also the TDRS A and B as most of you are aware are a pivotal point in the support for a Spacelab in flight 9.

END OF TAPE

PAO Okay, good morning and welcome to our change of shift briefing and miscellenous other things this morning. We are going to do this in two levels so to help maximize the effect I think. First of all, on my right the off-going Flight Director Randy Stone, the Amber Team is going to talk about what happened on the overnight shift, which is not to much, and as soon as we finish with that, we're going to let Randy go home. And then, we'll proceed into the discussions relating to the TDRS and the IUS. I'll continue to introduce here, to Randy's right we have Robert Aller, the program manager, that's the program manager TDRSS headquarters, and then next to him, Lt. Colonel Ralph Tourino IUS program manager, Space Division, US Air Force, and then on his right, we have Sid Sosher, the Marshall Spaceflight Center IUS project manager. We'll begin by having Randy tell us the events of the preceding shift. And if you have any questions for that we'll handle those before we proceed to the IUS and TDRSS activities.

RANDY STONE Well I guess I'm the one that has the good news to bring to this press conference. The Challenger is operating near flawlessly, the crew is feeling fine, they were feeling fine when they went to bed last night. In fact, Story Musgrave was so charged up with the day's activities that he wasn't ready to quit when the flight plan said he was in the pre-sleep period, so he elected to get a little bit ahead and did some check out on the space suits, Story has a real personal attachment to these space suits, he really wants to do the EVA on flight day 4. He accomplished a water recharge on EMU 1, which is to be our prime EMU, this was a planned recharge of the cooling water in the back pack, that went well. He accomplished check out of the backup space suit, and all parameters that he checked were nominal and that suit is go for EVA. That's really the only activity the sleep shift got to accomplish last night. We put the crew to bed, we were real pleased that the we didn't have any small problems nagging at us through the night. We didn't have a single alarm, the crew appeared to have a good night's sleep. Normally, with a new vehicle, at least on the first flight of the Columbia, we had several alarms during the night, they are just nuisance alarms, with the Challenger we had none of the nuisance alarms. We have several minor anomalies, I won't even call them problems onboard the orbiter, because they are so minor. We have a pressure in one of our hydraulic systems, and an accumulator that is going down, this is a phenonenom we saw pre-flight. The community believes they understand where the leak is in this hydraulic system it leaks down internally, we're not losing hydraulic fluid overboard, it's into the internal loop if you will. Should the pressure in this accumulator drop to a lower limit of about 1900 psi, we will run what we call our circ pumps in the hydraulic loop, we'll run them on a short duration duty cycle and keep this accumulator pressure pumped up, and it's absolutely no impact to the flight, and it's one of the things my team has gotten to sim a number of times because we had seen this

problem in pre-flight, and we had devised the procedures to work around it. The other problem that you may have heard about yesterday, we had an AV Bay fan, a cooling fan in AV Bay 1 that appeared to stall, playback data shows that this fan actually did stall, we're seeing stall currents on it. We have a redundant fan in that AV Bay, we have switched over and that fan has now been running for about 18 hours and the temperatures and the pressures in that AV Bay are normal. We have no concerns over that problem. However, should we sustain an additional failure in that AV Bay, another fan failure, we have developed an in-flight maintenance procedure over the night. My team has developed a procedure for going in and at least inspecting the failed fan, what we would expect to find is something that is actually jamming the fan and preventing it from turning, that's the signature of the failure. So we do have a procedure should it be necessary, but we do not expect it to be a problem. The orbiter is in an orbit of 155 nautical miles by 177 nautical miles, that orbit will be circularized later today in support of a rendevous test objective to approximately 153 circular nautical miles, the exact orbit following a pair of burns that are scheduled today, when I left the control center had not been determined, we had not done the final planning for that, for those two burns today. The planning team didn't have much replanning to do last night. Yesterday, from the orbiter's stand point, was exteremely nominal and very successful, and it left our team little to do in replanning today's flight plan. And if there are any questions, I'd be glad to answer them.

PAO Okay, we'll take the questions relating to the orbiter activities and we'll go to the other centers and then we'll move onto the other part. Paul Recer.

PAUL RECER Was the crew informed by teletype or some other method prior to your wake up call regarding the TDRSS problem? They seemed to be aware of it, when they woke up.

RANDY STONE Yes sir, normally in our nightly activities on the planning team we put together a summary sheet that gives the crew an outline of the following day's activity. And in that teleprinter message that we put up about 2 hours before crew wake up, at that time we summarized the information that we had, which at that time was very very sketchy, and we said at wake up that we would update the status of the IUS TDRSS, but we did tell them that we had lost contact with the IUS TDRSS shortly after the start of the SRM2 burn.

PAUL RECER And one other, has there been any private medical conferences at all?

RANDY STONE No sir, I'm very happy to say there have been none requested and none performed. And just to give you a quote, when I left the control center the only crewman that we had talked to

this morning was Story and he warned the execute shift that everybody was doing fine and to stand by cause they were going to come out charging.

PAO (garble) did you have questions?

PAO Craig Covault, Aviation Week.

CRAIG COVAULT In Story's early check out on the suits last night, did he go as far as powering the number three suit with orbiter power? To see if he could reproduce what they found on the ground?

RANDY STONE Craig, if he did I wasn't aware of it. And he reported no anomaly. We did that between sites and he came back and reported his findings, so I really don't know the answer to that question.

CRAIG COVAULT Just a follow up, quickly, the plan would be tomorrow, him to go through that routine more throughly with all three part upper torso's correct?

RANDY STONE, That is correct Craig, he was just trying to get a leg up and to make himself feel warm.

PAO Okay, and back over here with Mark Cramer.

MARK KRAMER (CBS) How much time did he spend working on the suits, and will that subtract substantially from what is scheduled for tomorrow?

RANDY STONE He spent about, I guess about an hour of time, I really didn't time it. I could have looked in the log and determined that but I really suspect it was about an hour, and it'll make the timeline more relaxed when he does the checkout on flight day 3, but not substantially.

PAO Carlos Byars, Houston Chronicle.

CARLOS BYARS After their pre-sleep activities, did you get indications that they went with the exception of Story, that they went on to bed, or did they stay up and maybe look out the window for awhile.

RANDY STONE Story did all the suit activity in the pre-sleep and just prior to the pre-sleep we talked to them up until one site before the normal go to bed time. At the site that we normally stop talking to them for sleep, they were in what we call the sleep configuration, all the CRTs were powered down in the proper configuration and we saw no activity in the cockpit.

CARLOS BYARS Okay, did they tie themselves down for the night?

RANDY STONE I was going to ask that question before I left the control center but there were other pressing topics of conversation, I didn't get to ask that. I will try to find out before the week goes by on where they are sleeping.

PAO Okay, if we have no further orbiter related questions, I understand we have none from the other centers. Randy and I will stick around and the moderator will be Jim Kukowski Public Affairs Officer with Office of Spaceflight at NASA headquarters, and we'll pick right up.

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This is our part two of the change of shift briefing to reiterate Robert Aller is the TDRSS program manager from NASA headquarters. Lieutenant Colonel Ralph Tourino, he spells his last name TOURINO, IUS program manager from Space Division. And to my far right, Sidney Saucier, that's spelled SAUCIER. Sidney is the IUS program manager from Marshall Spaceflight Center. A couple of quick groundrules, we ask your cooperation. No questions after the session. No one on ones. The reason most of these people here and over in the other building have had no sleep for anywhere from 24 to 36 or more hours. So after we do that, after we complete here we'd like to have them leave the building immediately. Hope it has the feeling of the old OSO 9 recovery. We'll start out with Bob 91ler from NASA Headquarters to give us a view of the situation with the TDRSS at this time.

BOB ALLER Morning ladies and gentlemen. I think I would challenge Randy. I think I have some pretty good news to talk about too this morning, at least we think so. We're in pretty good shape at this point from the TDRSS side and I'll tell you how we got there very briefly from the standpoint of the mission. Excuse me, I feel like I'm catching a cold. I've been doing a lot of talking during the evening. We had a perfectly nominal mission up to about 5 o'clock this morning. This is central time. During the transition stage we noticed we lost our telemetry we began to have some loss of signal. We lost just about all of our telemetry about 5 this morning. Just about the time of the second burn of the IUS. We continued in that mode attempting to understand the situation both aboard the TDRSS and the IUS. And about 8 o'clock this morning we were able to acquire the telemetry signal through Goldstone. IUS acquired I think about the same time. We got good lock at that time and we had preliminary indication that we had separated from the IUS at about 8:15 this morning. I can tell you now, excuse me again, that we have confirmed separation. So we are separate from the IUS. We began our nominal commanding sequence to deploy the solar arrays, to deploy the ground antennas, the so called SGL antenna, and the C-band antenna at about 8:25 this morning. That sequence went perfectly normal and by about 8:50 this morning we had the arrays slewed to the sun and the two antennas fully deployed. At this point in time we are under stable conditions on the spacecraft and we, just when I left to come over here, we'd begun a sequence that will last about 2 and half hours of deploying the single access antennas. We will study the situation. We are not in a nominal orbit. I'll give you the orbit we, the preliminary data on the orbit. We are in orbit of about 19,000 nautical miles apogee and about 12,000 nautical miles perigee. This gives us a drift rate of about 110 degrees a day to the east or between 4 or 5 degrees per hour. We have, however, total coverage of the spacecraft from our ground stations around the Earth. So we will be in constant touch with the spacecraft as it is drifting. Our plan at this point is to

evaluate our situation. We are at this point perfectly nominal from the spacecraft standpoint. We are studying what we can do to correct the orbit. As you know, we have 1300 lbs of hydrazine aboard. We have a thruster system and we feel that with several hundred pounds of the hydrazine system we can significantly correct the orbit to near geosynchronous. And we will be planning that over the next several hours. I think that is about all I have at this point on our status. I would say that this whole situation the past night reminds me certainly that this business we're in is man and machines. And the team that has pulled this recovery of the TDRSS back into a near nominal condition has been outstanding. We have been in full cooperation with our friends in the Air Force and I should add that at this time NASA and the Air Force is proceeding with the prearranged agreement we had of several months ago. And an investigative team will be formed between the Air Force and NASA to evaluate the IUS situation. That team will be announced here shortly. It's being evaluated by our management at this time. That's all I have.

PAO Colonel Tourino?

COL. RALPH TOURINO Let me just add a few comments to what Mr. Aller said. He said he had good news. My news is we have a lot of questions with respect to the IUS in terms of what happened. As Mr. Aller indicated, shortly before SRM 2 burn we experienced a switchover from one of our computers to a redundant computer. Shortly there after, we got confirmation that in fact, the second computer was in control and that the rest of the vehicle was okay so far as we could tell from the telemetry. We began the burn and a considerable period into the burn something happened. And at this particular point in time we have a lot of questions as to what exactly caused whatever to happen happen. We did lose telemetry as Mr. Aller indicated. We then worked with the TDRSS mission management team together in a very extensive and intensive period of trying to recover the mission. And it appears things are going better than we had hoped they would have been earlier this morning, that in fact the TDRSS satellite is stable and is being deployed. We will continue to gather the data from the many sources that it's at and do an evaluation. And as we get the answers we'll start to feed them back out to you.

SIDNEY SAUCIER Okay, we'll get questions here first. If I don't call you by name, identify yourself. We'll start with Craig Covault.

CRAIG COVAULT (Aviation Week) Question for both, the TDRSS and the IUS people, two separate questions. For Bob, what type of orbit, quick look data, what type of orbit do you believe you can achieve with the current RCS system.

BOB ALLER Craig, we're studying that. And we think we can get pretty close but that's really all I can say at this time. As I say we have several hundred pounds of hydrazine we can use for that purpose. We plan to use it. However, it's being investigated and we can't go beyond that at this time.

CRAIG COVAULT Following that your quick look assessment is that you will be able to regain some significant use of TDRSS A?

BOB ALLER I believe, other than having a nominal orbit, we have no indication that we have anything other than a perfectly nominal bird. So we will get use from TDRSS A in any circumstance and my hope is you can return it to a near nominal orbit.

CRAIG COVAULT Okay, and a quick one for the IUS side. Could you be a little more specific on how long, how far in front of the SRM 2 burn you started your telemetry problems with the TDRSS and also how far into the burn you were when you lost telemetry entirely.

BOB ALLER We didn't really experience telemetry problems before the burn. What we experienced was a reconfiguration of our redundant onboard computers. That occurred I think about 15 minutes before the burn. We got about 70 to 80 seconds into the burn. The nominal burn is about 104 seconds.

MARK KRAMER (CBS) I guess this is for the colonel. The orbit that you're seeing now does that indicate that there was an early shutdown? Does it indicate that you had some out of plane maneuvering and that's why you're not as high as you'd like to be and does the problem, is there some speculation that the problem is connected to the gyro anomaly that showed up last night?

BOB ALLER I think if I really said anything at this particular point in time with respect to out of plane conditions or the like it would be pure speculation. I guess what I'd prefer to do is to have a chance to look at that data in a little more detail and get back with you with some better answers that we have some confidence in.

MARK KRAMER Let me not ask for speculation. Is the spacecraft in an orbit out of plane? Was the thrust skewed?

BOB ALLER I'll let the.

RALPH TOURINO Yes, the inclination in that orbit that I gave you was about 2.4 degrees. You have to recall that we started out at about 28 degrees inclination. So most of the inclination was removed. The perigee is at 12,000 nautical miles versus the roughly 19,000 that we were shooting for.

MARK KRAMER I'm a little confused. Is that out of plane as planned? I mean, it was out of the launch plane.

RALPHA TOURINO No, the inclination is the angle measured between the orbital plane and the equator. We were looking for a zero, geosynchronous is zero, and we have about 2.4.

PAO Lee.

LEE DUMBART (LA TIMES) Mr. Aller, if you have to use up a lot of fuel to get the TDRSS into geosynchronous would that shorten its life on orbit.

BOB ALLER No it wouldn't. We have significantly more fuel onboard than we need to operate TDRSS. You may recall the fuel allotment on TDRSS was originally there primarily for the commericial use and primarily for the use of commerical K-band. To operate TDRSS in support of Shuttle and other Earth satellites doesn't require a major amount hydrazine, significant amount I should say.

PAO Carlos Byars.

CARLOS BYARS (Houston Chronicle) Have you had other problems with your IUS, colonel.

ALLER We had experience as it's well known in the first part of the IUS last October. A loss of telemetry about 2 hours into the mission. That was really the only the anomaly I think I could say that we had experienced up to this particular point in time. We were working earlier on in the mission a situation where we were having our redundant inertial measurement unit gyros tripping off the line and we were able to restore those with ground command. But with respect to the problem we experienced I would have to say that this is the first major problem we've experienced.

CARLOS BYARS But last October you had a problem with the gyros, you had a problem with the loss of telemetry.

ALLER I had a problem with the loss of telemetry. I am not aware that I had a problem with the gyros. Sid, are you aware of.

SAUCIER As far as the ignition in October, they were almost threading the needle as far as performance accuracy. Stictly a telemetry we had last October.

ALLER It was an extremely active mission in which we placed two communications satellites.

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ALLER It was an extremely accurate mission in which we placed two communication satellites in orbit.

CARLOS BYARS Okay, nevertheless you have had problems with this unit and now it is seems to be threatening a rather expensive and necessary NASA system. Are you all going to take a second look at this. What is going to be done to prevent...

ALLER I think maybe I understand the thrust of your question. Before the T34 D launch we had experience on the ground. Some problems I guess you could say with respect to the check out of the equipment because it was extremely sensitive to shifts in temperature. Since that point in time I think we've got an excellent understanding of the instrument. It's a very sophisticated instrument and we didn't experience any of those problems during the check out of the RIMU for STS-6 and it was, it maintained its stability very well over a long period of time. I think we understand RIMU much better than we did last October. We're learning the system because of its sophistication.

PAO Okay, we're going to go to KSC right now. KSC, you have questions? Put your ear phones on gentlemen so they can...

PAO Yes, we have questions and the first one's from Dave Dooling, Huntsville Times.

DOOLING For Colonel Tourino. First off, did the extendable exit cone on the second stage deploy as planned or have you gotten any data on that yet?

TOURINO I'm sorry. Could you repeat the question again.

DOOLING Did the extendable exit cone on the second stage deploy as planned?

TOURINO We had a telemetry indication that it did deploy.

DOOLING Okay, were there any indications that the RCS had to do any work to make up any off axis of thrusting during the burn.

TOURINO No we lost telemetry during the SRM-2 burns so we didn't have any telemetry on the RCS burn.

DOOLING No indication before loss of telemetry then.

TOURINO No.

DOOLING Okay, for Bob Aller. How many pounds of the 1300 of hydrazine would have to be used to circularize the orbit and would this be done in a continuous thrust or would you have to pop it at various times around the orbit and what implications would there be on that for the antenna and solar ray booms.

ALLER Those are good questions, and we're looking at all those now Dave. We have, as I say, several hundred pounds that we are planning to use for this operation. Exactly how we're going to use that fuel for orbit makeup we've not decided yet.

PAO Reggie Turnell from BBC. The mike is coming to him now.

TURNELL Two questions. Can you tell us whether the failure might be compatible with any sort of collision and was the initial report that the spacecraft was tumbling incorrect?

ALLER Well, let me answer the first one. No, we don't think there was any collision at all involved. We feel we've had a, as far as we can tell, we've had a clean separation. We have verified that we are separated and our spacecraft from an attitude standpoint and our sequence of deployments is perfectly normal at this time. At least it was when I came over here. We were in good shape from that standpoint. Yes, we were, we had some higher rates of rotation as a result of looking at our telemetry and that rotation on the spacecraft was completely stabilized by our attitude control system.

PAO Rob Zebb (?) from Channel 2.

ZEBB How close did you actually come to possibly losing the satellite and, without getting too technical, how did you manage to get it back under control successfully?

ALLER Well, I can say we got it back under control successfully by an excellent flight control team made up of NASA, Airforce and other folks around the world. We were, of course, concerned in the situation that we might lose the spacecraft. However, it was in an orbit that was relatively stable because it was high enough and by bringing to bear several of our network resources we were able to acquire the telemetry on the system, obtain a lock and determine the vehicle had stabilized itself on its attitude control system. I think that's about all I can say about that question.

TALLEY Olive Talley with UPI. A couple of questions please. First of all, Story Musgrave indicated this morning or at least questioned whether or not he or any of the crew members

on the orbiter had had any affect on the malfunction with the TDRSS IUS. Was anything that the crew did a factor in its problems and then I'll come back with my second question.

ALLER I don't believe we have any indication at all that anything the crew, any of the crews activities which were significant leading to deployment had any affect whatsoever.

TALLEY Okay, second question. Is there any connection between the loss of the satellite for that short period of time and 1) the delay in launch and 2) the effect that the gyro problems had, the effect that the qryo problems previously. Could you have gotten an indication that you were going to have problems if you had paid more attention to the gyro problems detected earlier last evening?

ALLER Let me talk to the latter one first. I'm not sure I remember the first question but the latter question you're referring to the qyro problem that we thought we had down at the Cape before launch. The last information I had on that problem by the way that it was really a telemetry indication in the logic of the telemetry and we did not in fact have a questionable gyro. That qyro had no contribution whatsoever to the problem. The spacecraft, I want to re-emphasize, the spacecraft has performed excellently throughout this whole operation and that the fact it stabilized itself from a rather high rate is an indication of that as well as an indication how well those gyros function. Now what was your first question again please?

TALLEY I understand that there was a slight delay in the launching of the TDRS from the vehicle. It was pushed back just a few moments. Might that have had any effect on the loss of the batteries in the IUS?

ALLER I'm not aware that we had a delay in the deployment. I thought that the deployment was right on the head. Is that correct?

On time to the second.

PAO In that row there. Right there.

John Ponderoider. I guess for Mr. Aller. You said earlier that even if you can't get the TDRS much higher using the hydrozene fuel that you should be able to use if for shuttle communications, et cetera. That seems to indicate to me that even if you get the next one up in August there might not be a significant effect on the European Spacelab Program this fall or is that too much to really say right now.

ALLER I don't want to conjecture where we're going to be in our operation with our spacecraft. What I said was that as far as the functioning of the spacecraft is today, as far as I know now, it is perfectly normal and that if we're able to correct the orbit to a usable condition where it is relatively stable we should be able to use this spacecraft in a near nominal fashion. I think with the situation we have today we're going to have to evaluate our total downrange situation here and we're not prepared to do that here today.

PAO Dick Lewis.

LEWIS (Salamander Books) You indicated that you probably have now a residual inclination of 2.4 degrees, I believe. If, can you, do you expect to remove that, get it into zero or if you cannot, would the failure to remove it have any significant effect in the operation of the satellite.

ALLER I think the maneuvers we will plan to restore the orbit will take the inclination factor into account. I do not believe it will be a major factor for us. However, as I say, we're in the process of evaluating that and whether we will use any of the fuel to reduce the inclination or not is yet to be determined.

PAO Final question from (garble)

For Bob Aller. My understanding of the whole TDRS network is that you wanted to have 2 operating satellites precisely in geostationary orbit and you've indicated that it's less than geostationary, subsynchronous if you will, you can get some use out of it. Isn't this going to vastly complicate the entire business of pointing and tracking above the spacecraft antennas on TDRS and lower altitude spacecraft?

ALLLER The condition of the orbit that we will end up in will determine how much service availability or what kind of an operation we will be able to maintain with TDRS and off nominal, whatever that condition will end up being, I'm not prepared to say at this point because I don't know.

PAO All right let's go to Marshall Space Flight Center right now. I believe they have one question.

JIM ADAMSON (Channel 1) Marshal Space Flight Center, Jim Adamson of Channel 1. I just have a couple of questions. First of all, in the first IUS launch in October where they had the telemetry loss as well, was an investigation made into the causes of that loss and was any insight gained from that that may give you an idea of what happened with this loss of telemetry this time.

Yes, an extensive investigation was made into the reasons for the loss and a substantial amount of testing was done to gain confidence that in fact we had fixed it. Some of the switches in the RF output experienced an effect called Corona and in essence deteriorated during switching and eventually caused the loss of telemetry. That was due because the switches did not vent properly. We subsequently installed sealed switches, went through an extensive testing program and I believe confirmed that for that particular telemetry problem the fix that we implemented had fixed the problem.

ADAMSON Okay, and I also wanted to know, in the simulations of the mission whether actual plans for a situation like this as far as what to do or are we kind of scrambling right now as far as how to get TDRS into a proper orbit.

ALLER No, we have had several contingency plans for what we call orbit makeup using the TDRS system and we have adequate time to prepare ourselves to go ahead and proceed with that and that's what we're doing.

ADAMSON My last question then. IUS was equiped with a rather sophisticated navigation system using the stars to put it in its proper, put the TDRS into its proper orbit. Is it possibly a failure with that system that put us in the situation we're in right now?

No, I don't believe that's the case but with respect to the TDRS mission accuracies the star scanner was not required for this mission.

PAO No questions from Marshall.

PAO Thank you. We're going to come back here for just a few more questions. The gentlemen have to leave really. We don't want to hold them up too much here. In the back there with the cowboy cap on.

JOHN BISNEY (RKO) The evaluation team you mentioned, is that just to look at this specific incident, or do you have some broader concerns about the IUS.

ALLER Since I mentioned the team was being formed, I'll give you my comment on it. No, the team is, this is a standard practice that we have when there is any anomally in the performance of one of the space systems and their charter will be established by my management and Ralph's management. I really couldn't comment on that but the basic purpose is to investigate the problem we've had today.

BISNEY You've had a lot of concerns about the IUS, regardless of your investigation. How confident are you on that?

TOURINO I'll take a cut at that.

ALLER Well, I'll answer the question. I have had great confidence in the IUS. I have no other concerns relative to the system. Obviously after what's happened today I have to have a concern regarding this particular problem and that's why we're going to investigate.

PAO Paul.

PAUL RECER You said TDRS had a high rate...

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Relative to this, obviously after what's happened today, I have to have a concern regarding this particular problem. And that's why we're going to investigate.

PAO Paul.

PAUL RECER You said TDRSS had a high rate of rotation. Just how high was that rotational rate, and was there any motion in any other axis as one?

I really don't have those details, I think generally all I can say is we had a relatively high rate of rotation stablized out, but I don't have the exact figures.

PAUL RECER Okay, do you know how much hydrazine was burned to stablize the craft?

I do not have that figure.

PAO All right, we're limited to two more questions here, this gentleman standing up.

BRUCE NICHOLS (UPI) Mr. Aller I wanted to try to get a little bit specific on what the possibilities might be, we don't know for instance how many thrusters there are, what their power might be, what their life might be, you have not been real specific about how much extra hydrazine you have, could we perhaps put some more, maybe some ball park numbers on what we've got on the hydrazine and describe in detail how this system would work. And how much time it would take theoretically to push it?

Bob, our TRW people should know, Yes I think, but you're asking the questions of how we are going to make up this orbit. And as I say that is being planned right now, and is going to be planned over the next several hours. I repeat that we have onboard, we had onboard 1300 pounds of hydrazine, some of which has been used, not much I don't believe, however, I don't have that figure. And how we will utilize our thruster system to make up that orbit that is being planned right now, and I don't have the details. When we have the details, we'll make them available.

BRUCE NICHOLS How many thrusters are there sir?

I don't have the exact number, the number that comes to mind is 16, but I'm not positive about that.

BRUCE NICHOLS How powerful are each of those, or do they vary in power?

I don't have that data. We will get that data however.

BRUCE NICHOLS We're talking about day's right? We're not talking about a matter of hours in accomplishing this, it would take day's no matter what works out.

We're talking about a significant time to make up the orbit.

PAO Last question, Lee.

LEE And my question follows that. When will we know how well you can do here?

I can't give you an answer because I don't know. We have concentrated our efforts in getting control of the Spacecraft. And getting it to a nominal situation where we know our inertial condition our center of gravity and that is the nominal situation we're in today. Our time frame, our timeline from here on, we haven't determined and when we do that information will be made available.

PAO We'll be giving out periodic status reports, and we'll establish a schedule. Our next change of shift briefing is at 6 pm. Please let the gentlemen leave and go back to Bldg 30, it is very important to them. Thank you very much.

END OF TAPE

PAO Okay, we're ready to start, good evening. Flight Director Gary Coen is here, he's just finished a 9 hour shift in the mission control room. He'll give you a summary of his shift and then we'll take your questions.

GARY COEN Okay, thank you. A summary of today's activities so far an easy summary would be that we're right on the timeline, in fact today we were periodically a little bit ahead of the timeline. There were two maneuvers planned today, which we accomplished. We did a forward RCS maneuver of 2 ft a second, and an OMS burn that was about 43 ft per second. The current altitude that the orbiter is in, it's in an orbit of 153 miles circular which is just about where we planned it to be. We have accomplished what we planned to do in terms of activating and starting the MLR objective. We've also got the CFES going now, and although there was some jitters in the data and it took a bit for it to settle down, the CFES is now working fine. Consumables on the vehicle are in good shape. We're about on the profiles that we expected to be. We have had some new anomalies on the vehilce, I suppose one in the environmental area you'd be intersted in is, we have lost one of the humidity separators, humidity sep B, there are two humidity separators on the vehicle. It popped it's AC circuit breakers, its powered by a three phase AC motor. It also popped the signal conditioner which carries some data back from that humidity separator. There is another humidity separator on board so we're operating on that one. You may have heard of some MLR problems reported earlier, we worked those through, and figured out that those were configuration problems. You also may have heard that we have had some problems zooming the onboard cameras. The crew did what we call teasing the switches, they operated the switches a little hard, and now they're able to zoom the cameras. The Ops 1 recorder problem, don't know how much background you all had in that, or how much you heard about it, but it appears to be caused by a piece of the tape that's wiped off, and causes the recorder to think that it should switch tracks. Occassionally, the recorder comes along as it's using the tape, finds this piece that is wiped off, and decides to switch tracks, and basically, bypasses some information for us. Now, we recorded the ascent data on the Ops 1 recorder, we have been able on occassion to get past this little spot on the track and at least downlink the ascent data, so we haven't really lost any data. But, the recorder itself is about, described as being about half useful because it jumps track about half way through the cycle. So, the recorder doesn't have quite the capacity, has about half the capacity that it should have. Of course, there is another Ops recorder, so what we're doing to compensate for it, is simply dumping the recorder more often. We do have some activities that we have scheduled extra today that we didn't have in the flight plan. They should be accomplishing at about an hour or so now, an added activity to clean out the filters in the inlet ducts, for the cabin fan and the IMU fans. We have in order to help

support the TDRSS activities we have been assigning some of our remote site stations to help the TDRSS activity, as the day goes on today. I think that about summarizes the shift, if there are any questions I'd be glad to work them.

PAO Craig Covault, Aviation Week, up here.

CRIAG COVAULT Could you be more specific on the electrophroesis jitters you mentioned?

COEN There are quite a few parameters that various pressures, I think there about all pressures that the telemetry or the data coming back from the transducers were noisey enough to give us alarms, there's a register onboard that keeps track of this data, and what's happening is the one, at least 3 different transducers are noisey enough to where they fill up this register. Right now Craig, we're just working the CFES with no operational problem.

PAO Carlos Byars, over here, Houston Chronicle.

BYARS Gary, what about the NOSL, did they get anything?

COEN I haven't heard, the only word we've had back from Paul on it was, he was taking some sitings, but we have not heard from him about what success he's had in finding lightning.

BYARS I don't quite follow you, you say he's looked but he hasn't seen?

COEN He doesn't report whether he's seen anything at all. What he reported was, that he was looking for some lightning, but he didn't say whether he found any or not.

BYARS Who do you mean by He?

COEN Paul Weitz.

PAO Any more questions here? Paul Recer, Associated Press.

RECER Was there a private medical conference today?

COEN No, there wasn't Paul.

RECER Okay.

PAO John Wilford, New York Times.

WILFORD I take it by the tone of your voice, you're not concerned about any of these anomalies that you just reviewed.

COEN No sir. They are items to work, of course, but as far as mission duration, or anything like that, there is no impact.

JEFF SMITH (Science Magazine) Could you bring us up to date on what you know about the TDRSS problem?

COEN Jeff, my knowledge of the TDRSS problem is a little bit, I would call it shakey, when we came on shift this morning, of course the problem had already occurred. I felt that I could better serve by working the orbiter, and kinda stay in the orbiter area. The TDRSS problem, since the TDRSS is up and away from us, I personally felt that I ought to concentrate on the orbiter, and the crew.

Paul?

RECER Do you plan to send a TDRSS update to the crew, via the teletype tonight? I mean, is that going to be a routine or what?

COEN We're working on a message, I don't know exactly the way we'll get the message up. But we are working on a status to the crew. Now, we already gave the crew a status test to what we thought the current condition of the TDRSS was, we did that early this morning. And we told them we didn't know the sequence it happened, we're working on a sequential thing now, we want to make sure we get it right before we work it air to ground.

RECER But I understand you're undecided as to how that message will be delivered?

COEN Right Recer. It'll be either voice or teletype, I assume.

RECER Either way.

COEN They did request that (garble) before the meal today.

PAO In the back row there.

DOUG MILLER (KTRH) Is there any sort of a problem with anything relating to the EVAs? Specifically the airlock?

COEN Well, there is what I would consider a minor problem and none of us think it will affect the EVA. There was a seal that the crew reported had come loose, and I believe Story reported it earlier this morning. It's a seal in the hatch where the hatch goes on the airlock. From what I can learn about it,

it's a groove around the hatch and this seal just pops in there. Story reported that the seal was out, and he simply pushed it back in there with his fingers. I understand there has been some experience with these seals at the Cape before and they have done testing where the seals have been out, people have manually pushed them back in. And done the testing with no problems as far as integrity is concerned.

MILLER Any idea what causes them to pop out?

COEN No.

JOHN BISNEY (RKO) I wonder if you could just characterize tomorrow for us, what sort of day it's going to be for the crew and what they'll be up to.

COEN One of the things John that we're doing tomorrow, since I'm working the entry team, that I'm awfully interested in, is the FCS check out. What that is, is a period where we bring up one of the APUs and we check out the aerosurfaces, check out the flight control system, is what it amounts to, in preparation for entry. The reason we schedule that so soon is that, if there are any problems with that check out we can make any adjustments we need to make, and have plenty of time to work them. But that is going to be one of the interesting things, at least tomorrow.

BISNEY How would you rate today in terms of busyness or activities with what we've been through so far?

COEN I would say it's probably about the same.

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BISNEY RKO Thanks.

CRAIG COVAULT Aviation Week Considering the orbiter power supply problems you encountered at the Cape with the first prime Musgrave suit, do you have any changes to the checkout tomorrow in terms of suit start-up or suit check-out, to perhaps troubleshoot that further?

COEN No, not that I'm aware of. Craig, there may be something that I'm personally not aware of because I don't really work the EVA activities. So, I'm not really a good speaker to that.

CARLOS BYARS Houston Chronicle Gary, the problems with the TDRS aside, considering the minor problems that you are having with the Challenger. Would you characterize these as all minor problems and how do you compare the maturity of the system, the overall performance of the spacecraft considering its the first launch?

COEN I think, considering the fact that it is the first launch that we have much better, we are getting so far, a much better experience on this vehicle than we might rightfully expect. I think the Challenger is a super vehicle, I can't say enough about the way the folks at the Cape and the folks that designed this ship and the folks that built this ship have put it together. I would also like to say while I'm kind of bragging that I think the crew is doing a tremendous job this flight.

PAO Here we have a question at Kennedy Space Center, we'll go there now.

I'm Sally with UPI, I understand that you said that you had no specific information about the status of the TDRS, however would you not agree that the TDRS problems cast doubt over plans to proceed with 4 other shuttle missions this year given the fact that 2 of those pertain specifically to the deployment of a twin TDRS and then also the spacelab?

COEN I don't think anything positive can be said about that until the the problem that we are encountering is fully understood. I think we'll have to take a wait and see attitude and see how the analysis and the process works out.

SALLY UPI But could you not give us some sort of general statement about the impact of the TDRS problems and how they might affect future missions and or this one and the overall program?

COEN I would hate to do that because surely if I tried to make a guess the data would come back and the experts would

analyze the case and show us all where I'd led you astray.

PAO I think that's a question for someone else other than Mr. Coen and I don't think that's necessarily in his (garble).

SALLY Okay, and one final question. Are we going to get an update on the TDRS tonight and if so, when and by whom?

COEN We don't have that information either, we'll try to find out and give that word to the newscenter down there but the people in the MOCR have not been working the TDRS problem and we just are not aware of what the plans are in that regard.

JOHN PINE REUTERS NEWS AGENCY Sorry to keep harping on this too but can we say that someone or some group of people are working constantly trying to figure out some kind of plan anywhere in Johnson, where, have you any idea at all?

COEN There is a group that's working on TDRS but it is not the group of flight controllers in the mission operations control room.

PINE But the flight controllers are not being kept up to date at all on the status of that TDRS situation.

COEN That's correct.

PINE Thank you.

PAO Other questions?

ABC I got here a little late so excuse me if somebody asked this question already but, have you got any information on the crew on how they were sleeping or eating today?

COEN No sir, I don't have any information on how well they slept or ate.

PAO KSC has no further questions.

PAO Anything at Marshall? We'll come back here, any further questions here?

DOUG MILLER KTRH. Is it possible for us to get someone in here who can talk to us about the TDRS? We've got quite a few questions about it. Is there anyone in the house who can address the questions about it?

PAO I have no idea. We'll find out after this is over. We'll check outside. We don't have any information on that.

MILLER PAO doesn't know whether there is anyone?

PAO PAO might very well have, this PAO doesn't know anything about it. I've been for 9 hours over there, I don't know but we'll check outside and find out. Carlos, do you have a question?

BYARS This is hardly worth a microphone. You said you didn't have any, didn't know how well they slept. I assume you also don't know where they slept?

COEN No, that's correct. That's a good assumption, I don't know where they slept.

BYARS We are just kind of curious as to, you know, who is tying whose ankle to what post and drifting around.

COEN I'm not sure you really want to know.

Oh, yes we do.

Just as a point of procedure, how well they sleep and how well they eat, that is not considered a part of the medical sanctions that we are under, is it?

COEN No, I don't believe it is.

In other words if they slept well or they slept poorly, we could be informed of that without violating their doctor-patient relationship.

COEN I would think so.

Okay.

They just haven't discussed it to Jon on the air-to-ground.

COEN I can say that when Story got up this morning, I don't know if you monitored the air to ground, he said he was raring to go. He was coming out of the docks charging.

I would like to echo the call for some more information on this TDRS business. There have been a couple of indications of people who have done calculations based on the published fuel amounts and the ISP hydrazine, whatever, that indicate that you got about 2/3 of the fuel you could use to put it on orbit and the 1/3 that you keep it there to for the required 10 years. I'm a little curious as to why unless there is something that we don't know, why that's such a difficult procedure. I can understand you taking time to work out the procedures to do the corrections but why you can announce that is

something that is feasible, I don't understand.

PAO I repeat again, you are talking to the wrong people and we will try to get somebody here to talk to you about it but we are not the right people.

COEN We don't do those computations.

PAO Not able to help you at all. We will try to do that after this particular briefing is over but we can't at this time. Any further questions?

Let me make an announcement here, I've been informed that Ed Smiley, who is the associate administrator for the office of, I'm not too good at these, Headquarters acronyms, Tracking and Data Analysis, is that right?

Okay, Tracking and Data Acquisition is on his way over here and I presume he will talk with you people about the TDRS.

Okay.

JOHN BISNEY RKO Again, I'm curious if your message to the crew this morning about the TDRS satisfied their curiosity or if they've been asking questions and little more curious about that during the course of the day.

COEN See they asked a question on one occasion and we gave them the status. They did ask again later on this afternoon and we didn't have an update for them. So they have asked twice and got a partial, or got an answer once.

PAO Okay, no further questions we'll end this briefing and let Mr. Coen go. Spacecraft television is scheduled for 6:43 central time. I presume that if you're not done talking, Mr. Smiley might want to break for that television, that's an 8 minute pass, is that right? 7 minute pass, and then I'm sure he'll continue afterwards.

PAO I think the other centers would like (garble).

Okay, thank you.

END OF TAPE

PAO Good evening ladies and gentlemen. Ed Smylie NASA's Associate Administrator for Space Tracking and Data Systems has agreed to come over and give you a fill in on what our current status is with the Tracking and Data Relay Satellite. And we'll go to questions from there, Ed?

SMYLIE Okay, thank you Doug. I think I'll just give you an update since this morning, and since I'm not sure exactly whether all of you were here this morning, and that the timing is to exactly where we were in the sequence. I will just update you on the current status of the TDRS spacecraft, and what our short-term plans are. We have deployed the solar rays, the C-Band antenna, which is the commercial antenna, for providing commercial services from the TDRS spacecraft. The antenna for space to ground link to communicate from the satellite to White Sands, we have partially deployed the single access large antennas that are used to communicate with orbiting spacecraft, by partial, I mean, we have deployed the boom, the antennas have to be rotated 180 degress, because in the stowed position they're pointing in the wrong direction when the boom comes out. So, we have to rotate them 180 degrees, we've done that on both the east and west antenna on the spacecraft. And we plan over the next several hours to unfurl those two antennas. At that point, we will have fully deployed all of the antennas and devices that must be deployed on the spacecraft. So far all of that is going completely normal, with no problems of any kind. The power situation on the spacecraft is good, we have slewed the solar rays to Sun, and we are operating with the batteries fully charged, and on trickle charge. So the spacecraft as of right now, other than it's orbit, is completely normal, and we have and do not at the present time expect any problems. The orbit is statute miles, I believe Mr. Aller this morning, was talking in nautical miles, and so you've been getting numbers, I've heard other briefings in which people have given numbers in kilometers, and so you've had a lot of numbers thrown at you. To be percise in statute miles which I think most people are more familiar with, the geosynchronous orbit is 22,335 miles, circular, the orbit that we are in as of the last report that I have is 21, 950 miles, by 13,540 statute miles, we're in a period of 16 1/2 hours in that orbit. Our inclination is 2.37 degrees, and we're drifting Eastward at about 108 degrees per day. Our next planned step would be to correct that orbit, to get to geosynchronous or as near to geosynchronous as we can. The crews that have been working, the spacecraft have been working fairly constantly since yesterday, our plan is after we get the single access antennas completely unfurled, and know that the spacecraft is in a safe condition which we know that it is. To go into something of a standout mode, we'll let the spacecraft operate in that orbit for awhile, while we step back, get rested, and review the situation before we take the next step, which would be to correct the orbit. Our current plan would have teams working that today and tomorrow, with a meeting sometime tomorrow evening with

management to make our final decisions as to how and when we will begin that circularization. It could take considerable time to do that, measured in days or weeks, because our thrusters are 1-pound thrusters so we will move quite slowly, and also because we have everything deployed, we would want to move quite slowly to the final orbit, that is pretty much our status right now. To summarize, our spacecraft is in good shape. We believe that we have the ability to reach the desired orbital parameters, and we will be proceeding to do that over the next several days to weeks. I believe that's all I have on status.

PAO Okay, we'll start with questions in Houston and then go to Kennedy. Please give your name and affilliation, Carlos Byars.

CARLOS BYARS (Houston Chronicle) Have you any assurance at this time that the antennas solar panels, what have you, that you have deployed, will handle the g-loads of moving the TDRS into geosynchronous orbit, do you have adequate fuel to do this? You've talked about days or weeks, could you fine tune that a little bit, so we'll have a little better handle on that. And finally what happened?

SMYLIE Well as far as g-loads are concerned we do plan to move the spacecraft across it; the normal operation of the spacecraft is to be able to move it along the geosynchronous orbit anyway, to reach the desired position. Over the 10-year life, we may move a given spacecraft from the east position to the spare position to the Pacific position and vise versa. So it's already designed to be moved from one place to another, and we will be utilizing that capability to do this. So the answer to the g-load is yes, we can handle that. It's a matter of time and how long it takes us to do it, but we're designed for that. On the question of what, let see, the fuel, that's what the team is working now, initial estimates are that we do have enough fuel, but that's what we have experts at both Goddard and White Sands doing, and we'll get reports on that tomorrow, I don't have the final answer on that yet. As far as what happened, we will have an investigation board, jointly between NASA and the Air Force to answer that question and we don't have an answer right at this moment as to what happened, except that something obviously off-nominal happened, and we ended up in the wrong orbit.

PAO On the front row, Morton Dean

MORT DEAN (CBS News) Do you have a thought as to what might have happened?

SMYLIE Well, indications are is that something happened during the burn of the IUS because that's when we lost the telemetry. The spacecraft is normal, so we would think that

something happened to the IUS, but we don't know what.

DEAN You don't have any theories at this time?

SMYLIE I don't have any theories. That's Air Force activity with Marshall Spaceflight Center and I'm busy trying to make TDRS work.

DEAN Is it possible that that cleaning process down at the Cape could have affected the satellite in any way?

SMYLIE In personal opinion, no.

DEAN Not like the maid coming in and breaking something, while she's dusting or something like that?

SMYLIE No, I don't think so.

DEAN Thank you.

PAO Craig Covault.

COVAULT Ed what, after you had the problem that you had, whatever it will turn out caused it, after you had that. What in the end saved you this morning? I'm not sure I understand whether you were able to command the SEP or whether it commanded itself to SEP, be pretty detailed in describing the events of the morning.

SMYLIE When we discovered that we had lost telemetry, one of the early things that was done was to begin to command separation essentially in the blind, constantly. We had no indication as to whether we had separated or not early on. But sometime later, to our relief, we found that we had separated. I don't know, I don't know that anybody knows at this point, that'll be another task for the investigation board to determine whether the commanding we were doing accomplished the separation, or whether it just timed out and separated. But it clearly separated somewhere along the line.

COVAULT Is it a Sunnyvale command to IUS to SEP or is it a White Sand's command through perhaps another station to TDRS to SEP.

SMYLIE I believe it's the Sunnyvale command through the Air Force network direct to the IUS to SEP. It's not a TDRS command to SEP.

COVAULT Thank you.

PAO Let's go back in the second row, Jules Bergman.

JULES BERGMAN (ABC News) And Bob, I have a two-part question. How physically is separation done, are they explosive bolts, squibs, or what, or simple springs, do you know that? And secondly, could the contamination that took, following up on Mort's questions could the contamination that preceeded the cleaning process at the Cape have effected the computers or stuff inside the IUS, to have caused the problem?

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SMYLIE I don't recall the answer to the first question Jules. I think it's the explosive bolts but I'm not sure about that. We'll have to get that answer for you. The second question, the cleaning process at the Cape was mostly the spacecraft because the IUS was below it, the spacecraft and I think there was very minor amount of contamination on the spacecraft.

BERGMAN I didn't say cleaning process, I said contamination process. In other words, you had a blowing dust of silica, sand, salt in the payload bay. Is it possible that it could get inside the IUS computers or whatever the electronic elements were?

SMYLIE I think that's another question for the IUS people but my understanding is that everything there is hermetically sealed and that there was no concern about contamination on the IUS or on any electronics in the TDRS either. They are all sealed containers.

PAO Okay, Mark Kramer. Right over here in the blue shirt.

KRAMER Assuming you determine that you can spend a lot of fuel and move the spacecraft, can you talk about how long a burn that would be at 1-pound thrust with 5,000 pound spacecraft. That sounds about 2 years. Or would you do it with multiple burns over a long period of time. Is is possible this thing won't be in the right orbit for 2 months, 3 months, 6 months?

SMYLIE The numbers that I have heard so far are measured in days to weeks, not in months to 6 months. It is likely that we will do it in a series of burns over a number of days. It's most efficient to do it at the apogee I believe and perigee. So it will be a number of burns over a period of time but that is what we have the team evaluating right now to make those tradeoffs and make recommendations as to how we would do that.

KRAMER Would a given burn be extraordinarily long, will those engines fire for 10 minutes, or would there be a lot of 45-second burns, and is there some sort of limit. I assume there is on the thermal load that you can put on it.

SMYLIE Well we've been talking about that some today and I've been asking questions, the information I've been getting so far is that those thrusters have been used on a number of other spacecraft for a lot of years going back to the pioneer series. They are qualified for continuous burn so we can burn them for minutes, maybe even hours, and so that's what we have our team working to again, make a recommendation as to how we would do that. I don't think it is burns of seconds, it's burns of, considerable duration.

KRAMER And, I guess this is my final question. Is it hoped that you can not only reach geosyncronous altitude but also take out the out-of-plane problem, that is get back to equatorial...

SMYLIE Inclination is only 2.37 degrees and just in normal operation of TDRS of over 10 years we would expect it to cycle plus amount of 7 degrees anyway and still maintain our service, so we don't have a problem with inclination. Paul did you have a question. Paul Recer back here on the second row.

RECER Yes, we were told this morning that just prior to the burn that you did a computer reconfiguration slip from the primary to the secondary. When the secondary came up did they tell you why the primary was switched off?

SMYLIE That was the IUS computers. It went, I believe, to computer A to computer B before the burn, the conclusion at that time was that everything was normal or at least within the right configuration and computer B had control. That is all I know at this point.

RECER Okay, well in your failure analysis in the buildup of this vehicle, did you determine what would happen to the thrust angle in the event the computer, both computers, went out during a burn?

SMYLIE I don't have an answer to that, again that's an IUS question.

RECER Okay, well one other question, you said that based on your estimates you have enough hydrazine to reach resonable geoosyncronous orbit. Based on those same estimates how much hydrazine would you have left when she arrived there?

SMYLIE Well, the hydrazine we have onboard was primarily there to provide stationkeeping for the commercial service that the TDRS spacecraft was also designed to provide. And in large measure that's what the hydrazine was there for. Since we do not plan to provide commercial service with that satellite we could utilize a significant amount of that hydrazine without effecting the life of the spacecraft for the TDRS mission. We don't know at this point whether we will be within that envelope exactly or not, and again that answer will come from the team that's working on this, I guess with their recommendation.

RECER What is that envelope?

SMYLIE The requirement for the 10 years of service is, I believe, something under 200 lbs of the hydrazine, we have 1300 lbs onboard.

RECER Having that much left when you arrive at geosync?

SMYLIE I don't have an estimate of how much we'll have left yet.

RECER The envelope is having that much hydrazine when you arrive in geosync, do I understand you correctly?

SMYLIE No, the answer I'm giving you is that of the 1300 lbs we have onboard, we need about 200 lbs or maybe less, to provide the 10 years of TDRS service from that satellite, whether the team that is working this problem to make a recommendation as to how, we will solve this problem. We'll end up with 200 lbs left, I don't know.

PAO Craig Covault, then we'll come back over here.

COVAULT I understand a very critical element this morning was battery power, but I do not understand whether it was IUS battery power that was fast departing or whether it was TDRS battery power. Could you straighten me out on that and tell me how close you came to buying it on that battery power?

SMYLIE That was the IUS battery that would be expended within the timeframe that we were trying to accomplish separation and that was one of the reasons we were commanding separation in the blind so consistently, because we knew that the IUS batteries would run out sometime shortly after the burn. The TDRS batteries were of concern also unless we got solar arrays out and working, but we had hours there rather than, I think under an hour on the IUS batteries.

COVAULT I was hearing less than 15 minutes on the IUS batteries or in that ball park.

SMYLIE That number flucuated in realtime quite a bit as people reevaluated and looked what was going on, but yes that's right it was in the 15 minutes or so range, I believe we finally ended up with a little more than that.

PAO Let's come back around over on this side, we'll take about 3 more then we'll go to the Kennedy Space Center. John Wilford?

WILFORD Is there anything about the shape of this orbit you're in now that would make it easier for you to go into a different position then geosyncronous orbit then the one you intended to go to. In other words it would be easier to go somewhere else besides northeast Brazil?

SMYLIE I don't know the answer to that. Where we really want to be is, that's right, about 41 degrees and I don't know

the answer to that right now, as to whether this orbit makes that easier or not, but it appears we might be able to arrive where we want to be in about the same timeframe.

WILFORD Secondly, the meeting, the management meeting tomorrow night, at that time will you make the decision to go for some sort of correction and will you be in a position at that time to announce what the strategy is and the t[illegible]

SMYLIE If we're confident at that point, yes, if we aren't, we will continue to evaluate the situation. There is no hurry, the spacecraft is in a safe condition, its moving eastward in a way that is alright, and so we feel under no great pressure to make this decision in advance of being sure that we have all data in hand that we need. And so we'll make the decision if we're ready, if we're not we won't.

PAO Okay, right next to him?

DICK HOGAN SCIENCE DIGEST I understand during the integration of the IUS TDRS combination at the Cape there was an incidence, it's been variously described as the spacecraft combination was dropped, last night I asked the question and they said it sort of slid down the J-hooks. Would you be looking at that again to see if that had some impact on this situation?

SMYLIE That's the investigation team's job, that data would be available to them and they will decide whether that requires any further investigation or not, that was very thoroughly reviewed at the time by a team of NASA, Air Force, Boeing, and TRW people. and we determined that there were no impact from that incidence, but the investigation team will certainly be made aware of it, I'm sure, and they'll make their decision whether they should look into that further or not.

HOGAN The other question. Go ahead.

lies in the nature of luck. It takes 200 lbs to last you 10 years and you have 1300, I have found out today that that's because of the commercial usages you talk about, the antennas swiveling around, and there's no commercial satellites now and the number being planned. I understand that there was a decision made before launch to whether to put the hydrazine in the tanks or to put ballast in the spacecraft to dynamically conform to its design, who decided to put hydrazine in instead of ballast, and will he get a medal?

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SMYLIE Well, I guess if we could find any such person then we might give him a medal, but I don't think there was any such decision. We'd always planned to put in the hydrazine. It was never even considered that we would not install the hydrazine, to my knowledge. Maybe somebody, somewhere thought about it, but I sure didn't. The plan was to always put in the hydrazine.

PAO Let's take one more here, and then we'll go to the Kennedy Space Center. Jules Bergman.

BERGMAN Bob, I would like to know what the odds are, in your opinion of flying out the 10-year mission with TDRS? And also a preliminary calculation I did with my handy-dandy calculator showed that with 24 1-lb thrusters it would take 2 hours of burning for 30 days just to loft the orbit, assuming all the thrusters pointed in the right direction.

SMYLIE Well, they'd all point in the right direction. We would most likely use some combination of two of the thrusters to do this job. And then I don't know, we'd have to compare calculations I guess. The people that are working the problem for me are not coming up with numbers like that, and I have not done any calculations.

BERGMAN And what are the odds of flying the 10-year mission? Assuming you reach the elliptical, the geosync orbit you want?

SMYLIE Well, it was always a statistical situation in terms of reliability and probability as to how many spacecraft it would take to accomplish 10 years of TDRS service. As you may recall, we have 6 spacecraft under contract. That originally was 6 spacecraft to provide both the commercial and the NASA service, so of that maybe 4 or so were needed to provide 10 years of TDRS service. I don't know of anything, at this point, that would lead us to believe that the spacecraft that we have placed up today or yesterday, is any less reliable then it would have been had not this incident occurred. Everything is working nominally. So I don't think the odds have changed.

PAO Okay, lets go out to the Kennedy Space Center, then we'll come back here.

OLIVE TALLEY UPI Bob, first of all a couple of questions. Can the TDRS function in its current orbit and if so, how well?

SMYLIE The spacecraft itself can, assuming the 90 days of checkout or so that we have to do on all the TDRS services go well, should be able to accomplish its function. The problem we would have in its current orbit is one of just the pointing of antennas from a moving TDRS to a moving spacecraft. And I think that would be something of a challenge. We have not examined and

at this point don't have anyone examining the feasiblity of that because our current emphasis is on putting the spacecraft where it belongs and operating it the way we always planned.

TALLEY Well, given that, is there going to be a problem with the launching of a twin TDRS, and secondly, and ultimately, what is the overall impact of the problems with the TDRS on the next 4 missions planned for this year. The hopes to get the Spacelab up and use both of these TDRS to communicate with it. I'm looking for a general statement on the impact of these problems.

SMYLIE Well, until we know what its going to take to place the spacecraft where we want it to be, and how long that is going to take and until the investigation team has analyzed the failure and has determined what corrective actions we must take, we don't know. There may not be any impact at all. But the investigation must proceed on the anomaly and determine whether that has any affect on the schedule for the launch of the second satellite. And as far as the first one is concerned, we have to determine whether there's any impact on our deployment of that spacecraft to its intended position and its continued checkout for its intended function. And we just can't answer that question right now. We don't know what the impact will be, if any.

TULLEY But are you even willing to say that this raises concerns about the future missions planned for this year?

SMYLIE I don't know why I should be concerned until I know whether the problem we've encountered warrants concern. We're working towards putting it where it belongs, as soon as we can.

PAO KSC has no further questions. I understand that there are questions at Dryden, we'll go to Dryden and then back to JSC.

BOB MOON AP RADIO NETWORK Can you tell me if there is telemetry stored onboard the satellite that might be played back to determine just what happened and if not is it possible that you might not ever be able to determine what happened.

SMYLIE There are no tape records on the TDRS satellite, and therefore there is no telemetry to be played back. Everything that we have, we have from realtime. In any anomaly investigation there's always the possibility that you will never determine precisely what happened, but that's what we have anamoly teams for. Is to do the best job they can, and getting the best experts we can within the country to analyze the situation and give us their best estimate of what happened.

PAO I understand there are no further questions at Dryden, we'll come back to Houston. Let's come up here to the

front row, Carlos Byars.

BYARS I've got two or three here, really. One, the gyro situation that caused a bit of a problem to being voted out has I understood that was on TDRS,

SMYLIE That was on IUS.

BYARS That was on IUS. Could, do you have any idea whether or not that was involved in this problem, is it part of the same problem, or different situation. Altitude, you mentioned trying to get it as close to geosyncronous as possible. Do you think your going to get it, how close do you think your going to get it? What altitude? And how long is this investigation going to take? Because that will impact time for your next launch.

SMYLIE As far as, as close to geosyncronous as possible, I guess I'll have to keep saying that I have to wait for the teams recommendation that we have working on that as to what they think can be done. I'm not making any calculations on my own. So until we hear from them, I do not wish to speculate on what the result will be. Our target is to be exactly where we had intended to be with this satellite. As far as the investigation team, how soon they will finish their job, I guess, as in most of these, as soon as possible, to provide the answers that we need to proceed. I presume the team will be in place and operating very quickly. This week some time, but I don't have the exact information on that.

BYARS What about the gyros?

SMYLIE That's an IUS situation. The, we did have 3 good gyros at various times and 5 good gyros at other times. I can not speculate as to whether that was involved in the problem or not. The consideration at the time was that it was not a problem. Three gyros was cleared as far as mission rules are concerned and capable of doing the job that we needed to have done, and we always had at least 3, as far as we need.

PAO Morton Dean.

DEAN Mr. Smylie, is there a ratio that you can describe for us, what is lost for instance in coverage or in any other way for every, say 1000 miles away from geosync that you finally find the satellite in.

SMYLIE I guess it's a little more complex than being able to provide a ratio. The spacecraft is in an orbit that is, generally in view of other spacecraft so it gets to be a scheduling and software problem, and being able to point, moving spacecraft with antennas on them at a moving TDRSS with antennas

on it. So it gets to be a fairly complicated navigation problem. As to whether we can to do that or not, I don't know because we aren't even looking at that right now.

DEAN In layman's terms, what would you miss if your only able to send this up to maybe 20,000 miles or 15,000 miles. What would be lost. As long as you had the other 2 in place eventually?

SMYLIE Well, we get the other 2 up in place eventually, we would not necessarily lose anything. We would eventually get a constellation up there of the configuration that we'd planned all along, because we have 6 spacecraft available to us, so we can replace a spacecraft that's not doing the job. It just takes time to do that. So what would be lost is time to have the full capability. I really don't have an answer as to what our operational capability would be if we were not precisely in geosync. I think it would be a very complicated operational scenario to do that.

DEAN So if you don't get this one into geosync, or close to it, it is likely that at some time in the future there will be a replacement TDRS up there.

SMYLIE Yes.

PAO Okay, lets take a couple of more and then rap it up. Paul Recer, there on the right.

RECER I only have a distant knowledge of orbital mechanics but with a 16-1/2 hour period and its drifting east at 108 degrees, how often does your thrust window, if I could create a term, occur? In other words, how often can you most efficiently ....

SMYLIE I'm told about twice a day.

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PAO Okay, let's take one more over here.

DICK HOLDERLAND In view of the importance of the IUS to the long-term DOD projects and NASA projects and whatever, and the fact that you don't have data on the failure, you basically don't have any telemetry on the failure, at least that's what I've heard. Will there be any consideration to going and getting the second stage, it's in orbit, you know where it is, or you can find out, and there'd be a reasonable mission considering that it's the linch pin of a lot of future projects being planned.

SMYLIE Our stage is roughly in the same orbit as the spacecraft and that's an orbit that's not accessible to anything we currently have to go get it and bring it back. It's far outside the Shuttle orbit, to be able to do that.

PAO Okay, I think that will wrap it up, thank you.

END OF TAPE

PAO Okay, Good morning and welcome to our change-of-shift press conference. This morning we have off going Flight Director Randy Stone with the Amber Team who can tell you what, what's been done over the previous planning shift tonight. And to his right we have Ed Smylie, Associate Administrator Space Tracking and Data Systems, NASA Headquarters. And we also will be attempting to patch in for audio only with Robert Aller at White Sands and we are working on that at the present time. I'll go ahead and turn it over to Randy who can describe what was done on the planning shift last night and then we'll proceed from there.

STONE Well, I think they're going to have to rename my planning team the sleep shift just because we haven't had a lot to do. Fortunately, the orbiter is still performing extremely well. We were able to accomplish all of our objectives yesterday by the flight plan and when that is done, the planning team has very little to do as far as planning the next day's activity. We can, I can tell you now that the flight plan will be executed today as written. We moved a couple of items around by a few minutes just to make things a little bit more convenient. I'll give you a summary of what is started already today. We wake the crew up early this morning and I had the wake up song. Ah, there it is - Teach Me Tiger by April Stevens. It was a, we also had our lady CAPCOM Mary Cleave give the wake up call to go along with the song. This morning we've already accomplished the rendezvous phasing maneuver number 3. It was done just as I went off shift just over the United States. It was approximately a 1 foot per second burn and it's just a tweak maneuver to get us in the right position for the rendezvous DTO that's in progress. Later on today we have several NOSL opportunities scheduled. The NOSL is the photographic equipment to look at lightning in the upper atmosphere. We have CFES scheduled again today to do the runs 4, 5 and 6. We did 1, 2 and 3 yesterday and that was totally successful at least from the standpoint as we can tell until we get the samples back on Earth. We have the FCS checkout scheduled this afternoon and that is just a standard practice that we have where we go in and check the entry landing aides and the control system prior to entry. It's scheduled on flight day 3 cause it was just a convenient time in the flight to do it. We do it primarily to assure ourselves that all of the hardware wasn't disturbed by the shake, rattle and roll of ascent. We also have a hot fire scheduled this afternoon of the RCS jets that we don't normally fire on orbit. We do this primarily this flight because it's a new vehicle. We have done it several times on the orbiter Columbia and it's just to check out the jets that just normally aren't fired in the day-to-day activity on orbit. This afternoon Story and Don Peterson will be performing the rest of the EMU checkout in preparation for the EVA. As you know we had already accomplished the checkout on the backup suit and everything on that suit looks good and today they'll be doing the 2 primary suits. They've got a little relief in the timeline if

they run into any problems because of the work Story did the night of flight day 1. You may have heard right before we went to bed last night the control center at least talking about a high O2 flow alarm that we got in the cockpit. It's something that we saw last night in presleep and the night before in presleep. It's a regulator that comes open to replenish the oxygen in the cabin. We're not sure exactly what the phenomenon is that's causing it. It is, it's really just an annoyance at this time. It's not a, it's not a real problem. The cabin integrity on this ship is extremely tight, almost no leak down that we can detect. That's just so you don't get worried hearing things like high O2 flow and things like that. This morning right at crew wakeup we had a report over a UHF station that the crew had a high N2 flow alarm. It did not stop. The crew reported that in the area where the orifice that allows the nitrogen to come into the cabin is located that they could feel considerable flow coming into that area. We secured the pressure control system at that time to stop the nitrogen flow into the cabin and we're evaluating right now what caused that flow. It is, it's no problem even if the automatic system has some problem that keeps us from leaving it online in an automatic mode, we can manually manage the cabin once or twice a day replenishing the nitrogen and the oxygen. So it's, it's really a non-problem from a serious standpoint but I wanted everybody to know that it was going on and the teams today will be working to determine what caused it and hopefully we can get back on the automatic control system for the pressure control of the cabin. As I say, the Challenger has been operating flawlessly. We don't consider the flow alarms that we've had to be any problem at all and I keep hoping that the planning shifts stay the sleep shift. It's very easy just to babysit this vehicle when it's workin so well. If there are any questions, I'll answer them at this time.

PAO I'll tell you what. Ed, would you care to say anything before we go to questions?

SMYLIE I think we ought to just go ahead and complete the orbiter and see if we can take care of White Sands and ...

PAO Okay, we'll go ahead and take care of that. Mark Kramer, CBS, right here.

KRAMER Last night shortly after the news conference which was about 6 or 7, whenever the new conference was, there was one message passed up to the crew to do a reset of some sort and whoever the CAPCOM was said we had a power out in Mission Control for a moment and we'd like you to recycle something. What was that all about?

STONE It was not a power outage in Mission Control. What it was, and I thought it was talked about in the last briefing or I would have mentioned it in my lead in, we had a power, a motor

generator that drives, is the power source to one of our computers in the Control Center (garble) line taking that computer down with it. We were down for about 20 minutes, the computer was down for about 20 minutes. We came back up in our standby computer and never missed a site pass with the orbiter but I believe it went up on the air-to-ground that the MOCR had a power outage and that was just an erroneous nomenclature going up. More precisely we had a MOC power problem, the MOC meaning the Mission Operations Computer. We were back up in about 20 minutes and had we been in a critical flight phase, as I believe most of you know we have what's called a dynamic standby computer on line at all times for the critical phases. It's on a different power source, has a different motor generator supplying power to it and so we would've not been down at all had we been in the launch phase or entry phase.

KRAMER Excuse me if I don't understand this but the computer that went down was the one and only main computer available at that time since it wasn't a critical mission time.

STONE That's correct. We don't keep up multiple MOCs if you will while we're flying onorbit unless we're doing a critical burn or like we'll have 2 up for the EVA just to make sure we keep data up and all.

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KRAMER And in the 20 minutes, it wasn't running, there was no telemetry anyway?

STONE There was no site passes. That's right.

KRAMER And the computer doesn't lose memory when it loses power?

STONE No, we periodically do what's called a check point, where we run all of the memory of the MOC off onto a disc so we can save any data that the flight controllers have input into the computer.

PAO Okay, Carlos Byars.

BYARS What's the state of health of the crew? Is everybody very healthy? Has there been any private medical conferences? Anything at all other than tip top shape?

STONE The crew has not requested any private medical comm, this flight, they sound very good. Generally, on the air to ground we can tell if a crewman's draggin a little bit, and not feeling well, and every crewman that we've heard since we've been up has sounded very strong and very good. We talked to, before I left, I heard PJ, Bo, and Don Peterson had already had conversations on the loop, and they sounded super, and just cause we hadn't heard from Story this morning doesn't mean anything, just cause we didn't have anything to ask him.

PAO Doug Ross.

ROSS (KPRC) If you could elaborate just a little bit on the rendevouz phasing going on today, and through out the mission, what it's for, and what you are trying to accomplish. I assume it has something to do with the planned solar max later on.

STONE Yes it does. All we're doing is demonstrating that we can arrive in a point in space at a particular time with the techniques that we developed for the orbiter. And the rendevouz phasing maneuver today, was just a very very small tweak to align yourself up to be at point at the right time.

ROSS Is this critical for developing some sort of models for your computers, or getting data for them? Or is this just basically playing around?

STONE I wouldn't say it is critical to the development, we are confident that we know how to build rendevouz programs, cause we did it very successfully in Apollo. But, it's just a demonstration now that we have changed, it's a little bit different vehicle and somewhat different mathematics have gone into developing these rendevouz sequences, we're just validating

it, so it will be ready for the first real rendevouz we've got with the Orbiter.

PAO Lynn Sherr.

SHERR Two questions. First is do you have any indication how and where the crew slept last night?

STONE I was hoping you'd ask me that. I did find out where some of them slept. PJ has been sleeping on the flight deck, and I assume he is somewhat in the couch, but that's just an assumption, he did not say, just said he spent the night on the flight deck. Both Don and Story are sleeping on the middeck, and we're not sure where Bo is sleeping, he hasn't reported in yet.

SHERR Also, you mentioned after the music that Mary Cleave had given the wake up, was that not supposed to be her regular shift? Was there a special reason why she gave the wake up?

STONE No, Mary is our back up CAPCOM on the planning team, we have two CAPCOMs on every shift, in general one of them is in training, and Mary is in training, she'll be a lead CAPCOM on a future mission. And what we generally do is split the air to ground time between the prime CAPCOM and the backup CAPCOM, it was just her turn.

PAO Craig Covault.

CRAIG COVAULT (Aviation Week) Well Randy, you've had a couple of days to look at Challenger work now, have you seen any system differences between her and Columbia? Consumable usage or things like that?

STONE No, we haven't in the consumable areas, it's going just as we predicted, so that says we had a pretty good handle on the electrical loads on the orbiter, in the same way for the propellant usage, it's staying right on our mission predictions.

PAO And Carlos Byars again.

BYARS What about during the Thursday space walk, the EVA? Is there any chance the guys are going to go back and take a look at the tattered insulation on the OMS pod? I understand that has been rehearsed in the simulator.

STONE I can't say for sure, that they are going to do that, Carlos. I haven't been involved in that planning, but I suspect knowing the crew and their enthusiasum for doing things, if we give them the opportunity, they'll go back and take a picture of it.

PAO Other let's go to other centers, I think we have questions from KSC. I also understand that we now have two-way communication with White Sands, so we can be getting in to that shortly. We have questions now from Kennedy Space Center.

REG TURNELL (BBC) Following up the last question, if the crew do go out to inspect the OMS pod, does that mean climbing out of the payload bay?

STONE No, I don't believe it means climbing out of it. I suspect, and this is just speculation on my part, I haven't been involved in the procedures development, that they'll just, on their long tether just kind of hop straight up and take a picture of it.

PAO Okay, that's all we have from KSC and I understand we don't have any at the other centers. Let's come back here now and if anyone wants to ask a question either of Mr. Smylie here or through White Sands, Robert Aller is standing on line I understand there for questions relating to TDRS if you have any.

I think we have George (garble) also.

PAO Oh do we? Okay. Carlos your first.

BYARS Did you want to make a statement first, sir?

SMYLIE If I may, I'd like to make one short statement, I guess. I think we have George Harris standing by at White Sands, he is the Director of the Operation there for the Space Comm company that operates the Satellite for NASA, and that team out there, in the last two days with George and Space Comm and TRW has really done an outstanding and superb job for us in recoverying the satellite, and keeping it in it's checkout phase for us, and moving towards the maneuvers that we will initiate sometime in the next few days to get us back to the geosynchronous orbit and get the program back on track. So we thought we would have Bob Aller who talked to you, I believe two days ago, he is now at White Sands after getting through a terrible snow storm out there last night. And George Harris to brief you on the current status of the program on a problem last evening that is now under control. I think we can turn it over to either questions or to Bob and George at White Sands.

PAO Okay, I guess we could see if they had anything to say in opening remarks before we went to questions, can you hear us there White Sands?

PAO Okay, do you we have any communicaton there with White Sands? Mr. Aller are you there?

PAO Okay, we're going to have to wait for a second to work that I guess.

PAO It's not via satellite.

SMYLIE I believe about 10 pm last evening, we were going through normal check out of the attitude control systems on the spacecraft, in the Earth mode, when we noticed that rates were diverging that there was some kind of a problem in attitude control. It was isolated to a roll thruster, plus roll thruster, stuck closed, the thruster was isolated we went to the redundant system. Got back under control, and everything is fine now. So, it was a fairly quick response to the problem we do have a redundant system and we're operating now on the redundant roll thruster.

PAO Okay, do we have the communication established yet with White Sands? Okay and Mr. Aller, can you hear us? Okay apparently, we still don't have that yet. If we want to have a couple of questions here, I guess we could do that, Ed if you're willing to take a couple of questions.

SMYLIE I'll try.

PAO Mark Karmer again.

KRAMER Mr. Smylie, did those thrusters ever unstick themselves, or is that one just gone and dead forever now?

SMYLIE We've not preceeded any further with that, we just isolated it at this point and preceeded with that check out, we'll come back to that sometime later and decide whether we can.....

KRAMER Prehistorically, on unmanned satellites, when a thruster goes array like that, does it ever come back?

SMYLIE Oh, yes, they come back, we've had it on Landsat 2 off and on for years.

PAO Okay, I've been told again, that we now think we are ready for this one more time. Okay, do we now have the two-way communicaton with White Sands? Trying to come through and couldn't make it, okay. Okay, we'll just end up getting a statement from those guys and we'll continue, if it's all right with a few more questions from here, and Irv had a question right back here.

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IRV CHAPLIN (ABC NEWS) Mention was made on the air to ground today about passes over the Orroral Valley tracking station being directed to the communications satellite. Will you explain what that was about? What your purpose was? What you learned from that?

SMYLIE Well, yes the TDRSS spacecraft is currently over the Pacific. In fact, I was told this morning, sort of over Guam, and so to continue to checkout the spacecraft and communicate with it we have to have access from some tracking station. So we will use the Orroral Valley tracking station today for that purpose and we had to reschedule around the Shuttle passes to do that and that was the easiest way to accomplish that rescheduling.

HERB CHAPLIN Was there something particular in the last period of time that you used it for and learned that way?

SMYLIE No, it's just that normally we would have been working from some U.S. station if the satellite were not in this strange orbit. In the strange orbit it's in we have to track around the world to a different station. We were using Madrid yesterday and we use Orroral Valley today to do that.

STONE I might add a little bit to that. We've been working with the TDRSS people and the Goddard network people to assure ourselves that we're not having any significant conflicts with the Shuttle. We have been releasing stations at their request all through the night and today and we plan to through the rest of the week.

JOHN WILBUR Two questions. Have you learned anything overnight that gives you any clue to what happened to the IUS and two, do you still plan this management meeting today and if so, when do you think we will have some kind of statement on what you're going to do?

SMYLIE On the IUS question. I am no longer directly involved in the IUS. That's been turned over to an investigation team. They're being set up. I think that will be discussed or released later today on that. And so, as nothing has happened overnight that I'm aware of concerning the IUS problem. I have no further information and I don't expect any myself. We will continue our planning today for the thruster burns that will take place to correct the orbit. And I believe, we will make decisions today as to how and when we will do that, but I don't know exactly when. When I get out of here I'll go back and start coordinating that.

PAO Okay, Lynn.

LYNN SHERR (ABC NEWS) Getting back to the thruster that went out that might come back. My understanding is there are 24 thrusters. Are there 24 backups?

SMYLIE No, there's 24 total.

LYNN SHERR 24 total, so at the moment there are only 23 usable. Would, clearly that has to come into the planning, I mean, when you're talking about the long distance that you have to go.

SMYLIE Well, it's not a significant problem. When we do this orbit adjust we'll probably only use two thrusters anyway to do that, most likely. Maybe four, but probably two, and there are a number of pairs of thrusters we can use to accomplish the orbit adjust. So this has no impact on that whatsoever. It's a roll thrust thruster anyway. We would not normally use a roll thruster for this purpose.

PAO Paul Recer.

PAUL RECER I've got three brief ones. What sort of rate did this roll rate to the stuck thruster put on the spacecraft?

SMYLIE I didn't get an answer to that when I discussed it this morning. We did get into a tumble.

PAUL RECER A tumble?

SMYLIE Before we recovered it, yes.

PAUL RECER Okay, so you had motion around the axes also then?

STONE It was a fairly low rate. I think it was only in the roll axles.

PAUL RECER Only in the roll?

SMYLIE In the low rate.

PAUL RECER Do you know how much hydrazine you had to use to stabilize it?

SMYLIE Not a measurable quantity. See it was stuck closed and what was happening is that the opposite thruster was thrusting through the deadband. And then the stuck thruster didn't correct for it and so there was no measurable amount of hydrazine used to correct for it.

PAUL RECER Okay, during the second IUS burn, you got a roll rate then also. Are these thrusters operational during that firing, solid rocket firing?

SMYLIE No.

PAO Morton Dean.

MORTON DEAN Because of the problem with the satellite, has any consideration been given yet to delaying the launch of the laboratory. And number two, if it takes weeks rather than days to get the satellite up toward geosynchronous orbit, do you think the launching of the lab will have to be delayed?

SMYLIE We are proceeding on a success schedule now for the - all of the succeeding launches. There are a number of things that have to be taken into consideration over the next few weeks in our planning including when we will be able to put the second satellite up and clear the IUS problem. We are proceeding with the checkout of the spacecraft on our normal not on our normal schedule but proceeding with the checkout of the spacecraft while we are orbit planning for this orbit adjust. So we are not losing day for day in the schedule on the first satellite while this is going on. Because that's what we were doing last night was going through our system checks.

MORTON DEAN Would the TDRSS have to arrive where it's going to arrive before the launching of the second TDRSS satellite? Would you have to know exactly where the first one will be orbiting before the second one is launched?

SMYLIE I don't think we will have to do that but we will be there long before that time.

PAO Okay, fourth row back here.

JUDY MULLER CBS NEWS Following up on Mort's question. Could you go ahead with the Spacelab launch if only one, whichever one, were deployed?

SMYLIE I believe that Marshall and PISA are doing planning for a single TDRSS spacelab mission. Whether they would elect to implement that plan or wait for some later launch to assure 2 TDRS's. I'm not sure what that decision will be but the planning is certainly going on for a single TDRS mission.

PAO Carlos Byars.

CARLOS BYARS Could you give us the names of the people on this investigating team?

SMYLIE I am not fully aware of who all of the members are and I think I would prefer that that be come through the NASA.

CARLOS BYARS Has the team been formed?

SMYLIE I think the people have been identified. Whether they have all been formally contacted and cleared for the team, I'm not sure. The reason I hesitate to give names (garble) will be taken care of some time later today. You'll get that answer some time today.

CARLOS BYARS Let me follow up

SMYLIE It's not my team, it's an Air Force team.

CARLOS BYARS Okay, you used the word "cleared" which has some ambiguous meanings.

SMYLIE I don't mean that, I mean -

CARLOS BYARS You don't mean in terms of security clearance.

SMYLIE Their management has agreed that they can serve because they can to be dedicated to this for quite some period of time, that is what I mean by clear.

CARLOS BYARS That is what I thought but I had to check, thank you.

SMYLIE I'm glad you cleared that up. (laughter)

PAO Lynn Sherr.

LYNN SHERR I realize it's a little late, but has there been any thought given to launching the second TDRS with something other than the IUS?

SMYLIE Oo.

PAO Mark Kramer.

MARK KRAMER Mr. Smylie can you explain, because I'm afraid I just don't understand it, the normal operation for the TDRSS in a geosync orbit is that other satellites will hit it with their data and relay to the ground. And those satellites, I understand, are not all in geosync orbit. Those are satellites that are essentially moving targets. I'm trying to understand what the problem is if you don't get the geosync. They have to hit, under the normal plan, they would have to hit a stationary target but they are moving. The way this TDRSS is right now it also is a moving target. So is the effect simply that the time during which you can hit it is lessened and is that the essence of the problem?

SMYLIE Well, it's a combination both of the altitude when we would be at perigee at the lower altitude than the other spacecraft would have a shorter period of time that they would be

in view of the TDRSS. When it was at apogee it would be about the same as geosynchronous orbit. The complication of the moving target is a matter of building software in the pointing systems of the spacecraft to be able to accomplish that, and I believe that can be done, but that's not the way the system's currently designed.

MARK KRAMER The way the system is designed those are the satellites transmitting to TDRSS, do they actually slew their antennas as they move in orbit and so this would

SMYLIE Some do and also the TDRSS antenna is slewed also.

MARK KRAMER This would require them to do that more rapidly and you think in some case that might be possible?

SMYLIE Differently, yes, I think it would be possible, highly inconvenient, but it would be possible. We are pretty confident that we are going to get the satellite where it belongs.

PAO Let's take one more here and then we'll go to KSC for questions, Lee, oh you don't have it.

SMYLIE We never got White Sands.

PAO Well, we're recording a statement of, taping a statement from Robert Aller and I think we should be able to play that back shortly. At any time. Okay, well let's take a few more, one more here and go to the other centers, Carlos.

CARLOS BYARS This one isn't terribly burning but how many, what's your contact time from White Sands with TDRSS, I know, because it's drifting around, it's now over the Pacific. Tomorrow, will it be over here 108 degrees, I'm afraid that my mind's not working right?

SMYLIE Currently, no I understand your question, currently we are controlling TDRSS through our existing NASA network of ground stations just as we are communicating with Shuttle with our existing network of ground stations. So White Sands is working through Orroral Valley, for instance today, to communicate with TDRSS. Yesterday White Sands was communicating through Madrid with TDRSS and we'll just move around the Earth as the spacecraft moves around the Earth. So we're never out of contact.

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PAO Okay, I think we'd like to try and move to KSC for questions there and go ahead and take care of those.

PAO Okay, I understand we're going to roll the tape of Mr. Aller's statement. (laughter) If there are some questions that need to be relayed we can relay those via telephone link so we're ...

SMYLIE We'll find if Bob Aller and I were coordinated. (laughter).

PAO Okay, so if you'll just ask the questions...

SMYLIE This is dangerous.

PAO We'll go ahead and see if we can roll the tape on this now. Trying to run the tape.

WHITE SANDS This will be George Harris, lead TDRSS Flight Director, Spacecom, at White Sands Ground Terminal. Give a statement on the line and then they're going to play it back at the press conference George. Here it goes, here's George Harris.

HARRIS Good Morning. I'm the offgoing lead Flight Director and the following is a summary of the work schedule that we have completed last night. We completed the deployment of the 4.9 meter mesh antennas, the SA antennas. At this time all TDRSS appendages have been successfully completed and verified. We've formed detail status checks of the spacecraft systems and established a baseline state-of-health signature. During the attitude control checks we observed roll thruster control problems which have been corrected. The spacecraft is now operating in a control mode with all subsystems performing as expected. During the coming day, spacecraft systems state-of-health monitoring will continue and the orbit adjust plan will be finalized. The orbit adjust plan will provide for raising the perigee, to circularlize the orbit that we're presently in. The implementation phase for the orbit adjustment plan is still being developed and we will have more of this at a later date. Thank you.

PAO Okay, do we have any questions for Mr. Aller while we're doing this. Craig.

CRAIG COVAULT (Aviation Week) This is Craig Covault for Aviation Week and actually it's for George Harris if he's available or Bob Aller if not. Can you describe some of the challenges the White Sands Flight Control Team overcame early yesterday morning when they were presented with an emergency situation. What things did they do that were a reactionary type command and control response to the problem?

HARRIS Contingency recovery procedures. I'll say again. The Control Team when we were initially faced with the situation went into a series of preplanned contingency recovery procedures. The first thing we had to do was to determine whether or not we had separated from the IUS and the most important thing at that time was to reestablish telemetry communications. We continued to send in a series of commands in the blind, as it's called, to reestablish our communication links and in the meantime we worked with the g-state and stations at Goldstone to provide continuous data flow once the signals had been captured. It took several moments, that seemed somewhat like hours, until we had established a lock on the spacecraft. When we found the spacecraft our signal was varying widely at about a 2 cycle rate. Again, contingency procedures were put into effect until we had neutralized the rate down to 0 or approximately 0 and we were able to establish good telemetry and at that point we were able to make an assessment of just what we had in the way of the spacecraft. The most significant event after that was to get the solar arrays on line. That gave us power into the batteries so we didn't have an immediate crunch on our power systems. From then we were able to go into a controlled management of our thermal problems which may or not occur due to the way we were facing. These were overcome rather rapidly and we went ahead into the solar array deployment which was completed just as we had practiced in simulations. From then on, it was simply a matter of completing the STL deployment, getting out the C-band antenna and stabilizing the spacecraft in a sun mode. Those were the peak points of the recovery.

PAO Okay, do we have another one directly for Mr. Aller? Let's see if we can go to KSC for questions now.

DAVE DOOLING (Huntsville Times) Dave Dooling of the Huntsville Times. Before I was so rudely interrupted, I was trying to ask some propulsion questions. First off, how long are the thrusters going to be firing to do the circularization, how much propellant do you anticipate using, and have the large single access antennas been fully deployed?

HARRIS The first series of burns will be approximately 3 hours duration in which we will inject about 100 feet per second into the orbit, approximately 100 feet per second. We're still working out the final details. This will continue until we've circularlized the orbit and it's estimated, and I repeat estimated at this stage, that we'll use approximately 900 pounds of fuel to get where we want to get at that point.

DOOLING Okay, is the single, are the single access antennas deployed and this circularization you're referring to, is this going to be circularizing at geostationary or at the current apogee?

HARRIS Could you repeat the question please?

DOOLING Okay, the circularization you referring, would that be a geostationary or at the current apogee and have the large single access antennas been fully deployed?

HARRIS I'll answer that in two parts. We're going to circularize at the apogee that we currently have and proceed very slowly to determine that we do have a good orbit and yes, all of the appendages have been deployed. Totally successful and verified.

ROB ZEBB (Channel 2) Firing at the rate you just described, how long will it take to get to the proper orbit?

HARRIS Oh, it will take several orbits to get there. As I say we haven't really finalized the plan but we're looking at probably 6 to 7 days to get to where we want to be and this course, of course for putting energy into the orbit only at apogee.

ED TOBIAS (AP Radio) I am unclear. Yesterday we were told that the batteries onboard either the spacecraft or the IUS were either dead or should have been dead. Did you find some life there that you didn't think was there?

ALLER Let me answer that. This is mysterous Bob Aller. I think I'm the one that told you that. Those are the IUS batteries you're referring to and those were the ones we were concerned about staying alive until we separated. Had nothing to do with our onboard batteries on the TDRSS.

TOBIAS Pardon me but I'm still unclear then. They were alive enough then for the separation that you hadn't thought they would be alive enough for a separation. Is that correct earlier in the game?

ALLER I couldn't quite hear all of that. We're running from one room to another out here listening to the question but it sounded like a clarification of the onboard IUS batteries that our concern was that they would retain enough power so that the separation command that required IUS batteries could indeed accomplish the separation. Now did that answer the question?

TOBIAS Yes sir.

PAO Okay, we'll go to Marshall Space Flight Center for questions.

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ADAMS (Channel 31) I have two quick questions. Of the hydrizene fuel onboard, I understand there is more hydrazine onboard than was necessary because of previous commerical requirements, that are no longer in the mission. What were those requirements initially? And how much more fuel is onboard now, than the absolute requirements for TDRSS mission?

ALLER Well I guess, I can answer that, that's what I said yesterday. The hydrizene requirements, or capability on TDRSS are 1300 pounds. The large portion of that was the fuel that was necessary to maintain attitude while using the commerical K-Band system which is a system of multiple antenna capabilities that were to cover the U.S. That required rather tight pointing and therefore rather tight control of the TDRSS spacecraft. We no longer plan to use that system in that way. Therefore, the excess capacity on the TDRSS will be necessary to circularize the orbit, it doesn't in any way effect the TDRSS operation. I should say the reason that - this first TDRSS was never to be used commercially, however, anyway, because it was to go to the East. But the way the system is put together all vehicles are identically designed so we will end up with three vehicles in orbit with the same fuel capacity, even though we intend to only use one commercially.

ADAMS How much extra fuel then is there onboard now, as far as in terms of the total amount of you have to utilize to achieve geosync orbit?

Well, let me answer that generally again, you're getting into the details of what our implementation of the orbit adjust maneuvers will be. I think it's generally accepted at this time, we'll be utilizing in the neighborhood of 800 to 900 pounds to circularize and that's a tenative number because we don't have the plan in hand yet, that would give us about 300 to 400 pounds on orbit, for on-orbit control. And that is plenty of attitude for support of TDRSS.

PAO Okay, I understand that's all that we have from Marshall, let's go back here Irv.

IRV CHAPMAN From ABC news, If you succeed in making your orbits circular at it's present aporgee, which according to my notes are something like 400 miles short of optimum, will you be in geosynchronous orbit? Or close enough not to matter?

ALLER Our plan is to correct the total orbit. So we're going to plan these maneuvers to circularize at an altitude of orbital altitude that will provide the geosync, so we are going to adjust the total orbit in this before we implement this plan. Or in the implementation of the plan, it will be a total orbit adjustment.

PAO John Wilford.

WILFORD From what I gather, you said in 6 to 7 days, you'll get to circularize at the current apogee, then will you raise the apogee, and if you fail to do that, what kind of operation could you have circularized at the present apergee?

ALLER Well, if I follow the question, your saying if we don't totally circularize at a geosynchronous altitude and end up with some slight drift, if we're under, we'll slightly drift East, if we're over, we'll slightly drift West. How can we operate and our normal contingency plan on any communication satellite such as this is to have the capability to adjust the final orbit to a geosynchronous altitude. So, I don't consider that a problem.

PAO Okay, back here, 4th row.

RUDY ABRAHMSON (Los Angeles Times) I understood you say, you're looking at a burn of about 3 hours. Isn't that a problem as far as damage to the thrustars? And is that the reason you're looking at doing a maneuver with only two of the thrusters?

HARRIS This is Harris, No we don't consider that a problem the thrusters were designed with the burn in mind, and we really don't consider it a problem.

PAO Okay, do we have. Mark Kramer.

KRAMER I know that on some earlier experimental Spacecraft there have been burns of ion engines that have gone onboard, I think days, but has there ever been a burn of a chemical engine that's gone on for anything like 3 hours?

ALLER I don't think we can answer that out here.

SMYLIE I don't have an immediate answer.

ALLER We just don't have an answer, we certainly haven't done it from White Sands, let me say that.

SMYLIE These thrusters are qualified for continuous burning, so I don't think that's a problem. Whether it's been done before, I don't have the answer to that either.

KRAMER But, could this in fact, be a first by a long margin?

SMYLIE I don't think so, but I don't know.

PAO Mort, did you have a question?

PAO Okay, Carlos?

BYARS Mr. Aller, I'd like to go back to John's question previously about the circularization of this orbit at its present apogee. We were told here that you planned to circularize at the present apogee, and that would not be a geosynchronous orbit. Could you explain how you are going to do this? Are you going to raise it so it's circular at the present apogee, and then raise the entire orbit? Or just what is it that you plan to do?

ALLER We are developing a plan, theorectically, the orbital mechanics of it are not that difficult, we're going to raise the perigee to apogee, then we can, with two more firings probably adjust the total circular height of the orbit. However, I can't say for our plan exactly how we are going to do it because I haven't seen it yet. But to circularize at the right altitude, theoretically, we raise the perigee to the present apogee altitude, then we raise that ciruclar orbit, with a couple of maneuvers the 2 or 3 hundred miles that we are off.

PAO Okay in the back here.

MIKE MITCHELL Do I understand that you consider you will still have enough hydrizene aboard to extend the life of this Spacecraft for the full 15 years, I think it is?

ALLER 10 year Spacecraft, and we will have adequate hydrazine for the 10 years of TDRSS operations.

PAO Okay, John Wilford.

WILFORD I still don't understand, don't think I've had my question answered. What if you don't get to geosynchronous orbit, what if you get only a circularized orbit at the current apogee? How much of a satellite do you have as far as operations are concerned?

ALLER I believe, I heard Mr. Smylie answer that question earlier. I think he did as adquate a job as we can. Our job out here is to maintain control of the Spacecraft and renew the orbit. And we think we are going to do that. I think Ed's answer as to what kind of a operation you have if we're unsuccessful at that is as good as we can do.

SMYLIE John we're just really not doing the planning for that right now. Because we don't expect to operate that way. So we really don't have a precise answer anymore of what I've already given you.

WILFORD If you get a satellite up to 22,000 miles, it presumably is effective part of the time, just not all the time is that correct?

SMYLIE Yes, but it would drift out of range of White Sands and you'd have a lot of things to look at in terms of where it would be when in order to utilize it, whether we would use hyrdrizene to bring it back every now and then. There's a lot of planning that would have to go into that. We're just not doing that. Because we expect to get to geosync.

PAO Morton Dean.

DEAN If you don't get to geosync, is that life expectancy of the Satellite increased or decreased? Is it still a 10 year Satellite or not?

SMYLIE We haven't looked at it. I really have not had anybody addressing that question, I know it's a burning question with you, but we're not working that question.

PAO Okay, let's just take about two more questions, and then wrap up, if we have two more questions.

QUERY Last night, there was a comment on a loop about the problem with the CFES. Anything on that? Was it a non problem, apparently things seem to be working well now. Also, do you have any other backup systems that have gone into use? You mentioned a couple during an earlier briefing, and nothing seems very substantional here. Any others?

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STONE The CFES question that you asked, we had some flow indications that were slightly out of limits. What we did we went into the software of the CFES, its sequencer, and changed a RPM on a pump to a lower number so it operates properly now and we did that again today for the CFES operations today. Your question regarding other backup systems that we put into use. I believe it was talked about in the last shift handover about the humidity separator that we had a problem with. That takes the moisture out of the cabin. We did have a problem with one of the two humidity separators onboard. It is not operational at this time, there was a short some place in the system and it was taken off flying automatically and we do not plan to bring it back on. And the alternate system is working adequately.

PAO Okay, alright let's wrap this one up, and thank you very much.

END OF TAPE

PAO Good evening, we're ready to start. Gary Coen will given you a summary of the shift that he lead in the Mission Control Center the past 8 hours and then we'll go to questions, Gary.

GARY COEN Alright sir, today's shift we ran about an 8-hour shift today. We, again today, a lot like yesterday, we were right on or ahead of flight plan most of the day. Summarizing consumables, we're in good shape again on consumables. We did reach some milestones in the mission. We have completed the CFES activities. The CFES folks, the experimentors, say they are very happy with the results and went out of their way to congratulate the crew on the performance of the experiment and they're quite happy with what they've gotten. We were able to track some NOSL information today over the northern Gulf. The CDR had a tracking period and ground folks knew that they had the proper weather so the CDR at least had a opportunity. He did not report whether he had seen any actual lightning during the test but he did track. The MLR, the active portion of the MLR is over again per the flight plan. So about the only activity that will be upcoming with the MLR will be a stirring operation that's started prior to entry. We did a small rendezvous burn this morning. It went off okay. No problems there. There were some, we did a flight control system checkout. What the flight control system checkout is, it's a way to move the aerosurfaces on the vehicle to make sure that you've done a little bit of a dynamic checkout of the rudders, bodyflaps, and what not. It also, part of the flight control checkout, is the checkout of the avionics equipment and the sensors and the navigation gear that's used for entry. There were some minor problems there mostly having to do with things that were slightly out of SPEC. As an example, we had a rudder reading that was 1 percent out of SPEC. None of those things were felt to be significant. Early in the shift we had some ground problems with transmissions, UHF transmissions. The crew reported that when we talked there was a buzz and a high frequency noise from the ground that was reported over two sites and we have since cleared those problems. We're working up a manual procedure in the environmental systems. The, on a few occasions we have had alerts or alarms in the vehicle that indicate that we're flowing too much, either sometimes oxygen sometimes nitrogen. The time duration of these occurrences has been very small. We've had maybe two or three occurrences now. What we're concerned about, there's no concern at all for the performance of the system. Our only concern is that if we have one of these occurrences while the crew is asleep that it might disturb their sleep. So we have today worked up procedures that manually configure the system such that while the crew is asleep that we won't get these nuisance alarms. We, in the propulsion area, had a small leak through one of the downfiring jets on the left RCS system. We have temperature transducers that indicate to us when we have a leak through one of the RCS jets. This particular one was jet L2D. It leaked fuel. What the

temperature transducers are designed for, and what they do, is measure the temperature inside the injector of the jet. If fuel leaks through that injector, of course, the temperature goes down. The reason the temperature goes down is because the vacuum in space quickly dries out the fuel. The fuel, of course, is a liquid fuel and the temperature decreases and it tells us we have a leak. The automatic, the computers onboard sense these temperatures and when the temperature gets below a low limit, it quits using the jet. That occurred on, like I say, on jet L2D this morning. The computer properly deselected the jet, quit using it. There are other downfiring jets that control attitude. Subsequently that leak, fuel quit leaking, the jet is now up to the proper temperature. This afternoon we're going to do a hot fire on that jet to make sure that it's working properly. The hot fire's normally planned so that's nothing special either. The reason we do a hot fire is to check out all the jets at sometime prior to entry. So there's no real change to the plan but we're going to be interested to see if that jet shows the same characteristic. There was a PMC requested today by the CDR. It fell in the category of being of no mission impact so our new recently developed groundrules apply. Some minor problems with checkout of the EVA equipment. Story reported that one of the straps that holds his cuff checklist on. Now what they have is a set of procedures that are written up on a small little card and this card is strapped to his cuff. And there is a strap that holds this on. Story found out that that was broken and reported that to us. The spare EMU he was not able to get the cover back over it. There is a cover on it that is used to keep the arms from flopping during entry. And he was not able to get the cover completely backup over it. I understand, or have been told, that it is particularly difficult to get that cover back on. And that is not a mission impact, although I guess the arms will be waving during entry. We, on the EOG experiment, there is one channel of the EOG data that is not coming through. We have checked the cable connectors. The crew told us that the cable was stretched awfully tight on that connector. We are getting good EOG data. This is the data that comes through this particular cable as reference data so, we will be getting the results of the EOG tests, and have been getting them. I believe that's a fairly quick summary of what we did on the shift today. Are there any questions?

PAO Craig Covault on the front row here, Aviation Week.

CRAIG COVAULT AVIATION WEEK Gary, I wasn't paying that much attention this afternoon. During the FCS checkout did they fire up the head-up display and do it, HUD checkout as well?

COEN Yes they did and it went off okay. There was some discussion air to ground, Craig, about some overwrites of parameters and after looking back through our documentation we figured out that those overwrites were normal for what test mode

we were in.

CARLOS BYARS HOUSTON CHRONICLE This private medical conference that was requested by the commander. Was that, can you say, did that apply for him or for another member of the crew?

COEN I can't say Carlos.

CARLOS BYARS Okay. Can you tell me, I've got a question here about the spelling of the flight surgeon's name. Is that LEF as in fox ton, or les as in sugar?

COEN F as in fox.

CARLOS BYARS Thank you.

PAO Let's go back and get Irv Chapman and then over and get.

IRV CHAPMAN ABC NEWS There was a reference on the air-to-ground about discomfort at taking a meal during certain maneuvers about an hour or an hour and half ago. Would you explain what it was that created the discomfort? What was the motion of the ship and was there any relation of that to the discomfort that resulted in the medical call? Would you rule out motion sickness?

COEN I really, first of all, the medical call, the PMC, was prior to that particular discussion. Secondly, I would not choose to relate that call to any other one. I can explain, I think, when the comment was made we were doing an antenna test. And what this antenna test requires is for the vehicle to roll at a certain rate. And what the people are doing is looking at when the antennas lock up and drop out as the vehicle rolls. PJ did make the comment that it was an uncomfortable maneuver but I don't see any correlation as far as PMC and maneuver.

IRV CHAPMAN Well, if it's unrelated would you rule out motion sickness which has apparently afflicted practically every flight so far?

COEN I really don't care to talk about it.

PAO Paul Recer and then we'll go to KSC for questions after this.

PAUL RECER AP Did the flight surgeon tell you who was the subject of the discussion and the ailment that was under discussion?

COEN Paul, in keeping with our new policy I'm not, I don't think that that's pertinent.

PAUL RECER Well, that question was in line with our new policy because as it was explained to me that anything that was told to you by the doctor is releasable to us, I believe.

COEN No, that's not correct, Paul. The copy of the policy says that in the event a PMC does not disclose information which will or may have a mission impact the contents of the PMC will not be released to the public. I can assure you there's no mission impact.

PAUL RECER Okay, but the doctor telling you what they talk about, somehow or other does not infringe on patient/doctor confidentiality but it does if you tell us. Is that what you're saying? Okay.

PAO Okay, let's go to KSC.

PAO Questions from Dave Dooling, Huntsville Times.

DAVE DOOLING HUNTSVILLE TIMES First off, the extra test that was mentioned at the end of the CFES run, what did that involve and what was the criteria for turning down MDAC's request to conduct it?

COEN Dave, I believe that was at the request of MDAC to not do the supplemental test.

DAVE DOOLING Okay, so that was, I guess, partly the result of them being satisfied with the results they got on the other six runs?

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DAVE DOOLING Huntsville Times First off the extra test that was mentioned at the end of the CFES run, what did that involve and what was the criteria of turning down MDAC's request to conduct it?

COEN Dave, I believe that was a request to MDAC's to not do the supplemental test.

DOOLING Okay, so that was I guess partly the result of being satisfied with the results they got on the other 6 runs.

COEN Exactly.

DOOLING Okay, could you recap the activities as related to you by the crew on the NOSL? How many sitings do they attempt or how many opportunities are passed up to them?

COEN There is one opportunity passed up on our shift today. It involved sitings over the Northern Gulf near Mississippi I believe. They didn't report what they saw but they did report to us that they were taking sitings.

DOOLING Okay, was there any getaway special activation scheduled today or activities on them?

COEN I don't have the flight plan here with me.

DOOLING Okay, and did I hear a report earlier that the icing that had been seen back at the tail area was believe to have gone away?

COEN We specifically asked the crew today before using the APU whether the icing was there or not and they gave us a report that the icing was gone.

DOOLING And did it come back after APU?

COEN Don't know.

COEN There's no report there, Dave.

No more questions from KSC.

PAO Okay, we'll go to Dryden for questions.

(Garble) this exchange over the discomfort during the antenna experiment with the antenna in motion. Later on in that same exchange the Houston said that it's time for a meal and one of the astronauts replied back, we wouldn't want to try eating a meal while you're doing this. That seems to imply that they were having some kinds of problems with meals and with motion.

COEN I interpreted that probably more innocently and that was that while you're spinning you - things float away from you and I interpreted that really as being - I've noticed that when they eat you know and we've watched on TV that the people eat they set things out in front of them like they'll have a drink and a special little drink canister. They'll just set it in space there and go back and pick it up later. I presume that's what he ment.

BOB MOON AP Radio The words were that this is an uncomfortable maneuver. My question being in weightlessness of space why would that be an uncomfortable maneuver?

COEN I suppose what he was saying is that he has been in zero-g for a long time and he had the vehilce maneuver at a fairly high rate and I suppose that it - take him at his words it was uncomfortable.

MOON Can I ask a follow up question? Can you tell us that there is no motion sickness aboard the craft in general terms?

COEN No sir, I can't.

PAO Okay, we'll come back to Houston, Carlos Byars.

CARLOS BYARS HOUSTON CHRONICLE Has there been any further developments in the APU hydraulically?

COEN No in fact the APU we choose to use today for the FCS checkout was the one that we had seen the internal leak that you've been hearing about. We did that purposely to recharge the cumulator to see how that system would act. I don't know if you've heard but the analysis is that leak is in one of the internal components and what it causes is slow decay in the pressure that's used in the cumulator which - this cumulator pressure is needed to start the pump. So periodically, if the leak had been in a bigger rate, we would want to either turn the circ pumps on or occasionally run the main pumps. Of course it's easier since the circ pumps are electric - turn those on for a real short time and then turn them off. We have not - the leak has never been large enough for us to be required to even turn on the circulation pumps. So just to take advantage of the fact that we would have a pressure head in the system we used the APU 2 today so that we could build up the pressure head. When I last got a report of what the pressure was, it was like 2700 PSI. The specialist in the APU area told me that they expected that pressure to come down because right now the system is hot because the APU has been running and they expected that pressure to decay somewhat, so it will be sometime before they will be telling us whether they have seen the characteristic again that indicates a leak through this internal valve.

PAO Morton Dean, CBS.

MORTON DEAN CBS Other than what we know about the insulation pads on the OMS pod has there been any indication that any of the tiles has been dinged or ripped off, any debris found on the launch pad that would suggest that all of the tiles did not survive the ascent?

COEN I'm sure you've seen the TV that shows the stub on one of the windows and the two little pieces of gatfiller that are coming out of the - their necks to one of the other windows. We have of course enquired as to whether that will be any particular problem for entry. We've also been curious to whether that would possibly streak the windows. The experts involved tell us that - no there's no real thermal problem with the basic structure if the vehicle or the structure behind these gatfiller that's sticking out nor is there any problem expected with this stuff possibly melting and streaking the glass or streaking the windows.

MIKE TONOW Miami Harold The purpose of the new medical policy is to protect a person's privacy. Is there some reason you can't tell us how many people needed medical conferences?

PAO We're not going to discuss the medical conference and I think we're just wasting time of we continue questions on it.

TONOW Well you told us there was one.

PAO Yes that was - -

TONOW Is there some reason you can't tell us how many there were?

PAO How many medical conferences? There was one medical conference today.

TONOW How many people did it involve?

PAO I have no idea.

TONOW Does the Flight Director?

PAO I think we've told you all we're going to tell you about the medical conference since it was determined that it would not have a mission impact. So there's no reason to pursue that any further, because you'll get the same answer. This gentlemen right here.

CRAIG SMITH KPRC Radio Musgrave said just recently out of 8 EMU batteries he checked, 4 were dead and 4 were not good. Does that threaten the EVA tommorrow?

COEN I didn't interpret that report as being what you said either. He just recently said this since I've come over here?

SMITH I think he said it shortly after the shift changeover.

COEN I think you best pose that question to the next flight director.

SMITH Okay, I was unsure - -

COEN He'll be able to give you a better status cause that doesn't sound consistent.

PAO (Garble)

To pursue that line, was there a - you seem to have information, what information do you have as far as the status of the batteries during your shift? Were the batteries checked and how did they check out?

COEN Four bad batteries and 4 good batteries and we left word with the next shift to check out the status of the other four.

Four bad batteries, four good ones and suppose to look at the other four.

COEN Right.

Would that situation impact the EVA tommorrow?

COEN No sir.

PAO Morton Dean.

MORTON DEAN CBS Just expand on that what does that mean 4 bad batteries? What problem does that create?

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GARY COEN This are the batteries that there's a little TV set in his helmet and there is a light unit on his helmet. These are the batteries that power those units. I don't think that those batteries are going to have a mission impact regardless of the number that we have.

PAO Back row, back there.

DOUG MILLER KTRH Well we heard earlier that one of the crew members said they had a fixation light or at least a mission control advised the crew that they had a fixation light on eye movement. Can you explain what that means?

COEN No sir, I can't. I'm not an expert in the eye EOG experiment itself. I can research that for you if you'd like.

MILLER Have they had any problems resulting from eye movement on this mission?

COEN Don't know that either.

PAO This gentleman right here.

DAVID DOWL CBS NEWS Back to the battery question. Are there spares onboard and the facility for changing them if there are?

COEN 12 is all we have, David.

DOWL So, there is no facility for, no ability to change them?

COEN You could swap, yes, you could swap batteries out. They're removable and you can change them out any way you want to.

RECER Oh, how many of these batteries are required for each spacewalk or each spacewalker per session outside the cabin?

COEN There are, let's see, there are 4 per unit. So there are 4 in each, so that would make 4 times 2. That would make 8.

RECER Okay, and to your knowledge now, you only have 4 good ones, since the other, the last 4 of the 12 have not been checked?

COEN That's right but, but we're, I'm sure the next shift will get a checkout on your (garble)

RECER Okay, one other question. Did you plan or the folks that followed you, did they plan to send up additional instructions or any changes in the EVA for tomorrow on the

teletype or is it going as planned as far as you know? Any additions or subtractions?

COEN As far as I know it is going as planned. There may be some minor things having to do with photography but they've got that in work.

RECER But the EVA itself has gone as planned? Do you recall what those minor things doing with photography are?

COEN There have been some talk about whether we would take extra pictures of, say, the gap filler that is sticking up back in the OMS, might get a little closer to carry it back for documentation purposes.

PAO Craig Covault

COVAULT I understand Bill Fisher did some exercises suited today to help support tomorrow's EVA. Can you tell me what Bill was doing?

COEN No sir, I don't know Bill was up to, Craig.

PAO Okay, I'm informed there will be a update on the tracking and data relay satellite at tomorrow morning's change of shift briefing and there will be television from White Sands at that time. Any further questions? I'm sorry John, I don't...

(garble) pardon me, 11:15 here.

PAO 11:15. Okay, thank you very much.

END OF TAPE

PAO Good morning everyone and welcome back. We'll begin with the change of shift debriefing by Randy Stone and then invite your questions and then go to White Sands and have a briefing on the status of the TDRSS. And I'm sure you remember Randy from previous briefings. I'll let Randy cell you what happened on his shift.

RANDY STONE First of all, I'd like to answer the question that I suspect many of you are going to ask me in a minute. There have been no more private medical conferences with the crew. They are up this morning, feeling fine, at least feeling fine from the standpoint what we can see. They are all doing what they're supposed to be doing and we're very happy with their performance today. We accomplished the flight plan yesterday by the book. Everything that was in the CAP, I believe, was accomplished on time or near on time. I came on shift last night after we put the crew to bed and was greeted with another calm day of no replanning. About an hour into the sleep period we had indications that a temperature on a water feedline to our flash evaporator system was going down. This is a line that is heated by some heaters to protect it from freezing when it's not in use. The flash evap was not in use last night. There was no requirement for it so we depend on these heaters to keep the water in those lines from freezing. We noted the temperature going down and expected that we were going to get an alarm shortly. We did get an alarm. It woke up the crew. It may not have been the entire crew, I wasn't able to check this morning. But the next AOS, PJ was up on the loop to talk to us, to tell us he had the alarm, and ask our advise. Turns out that we had a heater fail off and we switched to the redundant system. If you all go back through the notes you will find that we had switched off of that system earlier in the flight because we had one heater that was cycling a little bit higher, a little bit higher temperature than was normal. However, after we selected back over to the original heater system the temperatures went back up to the normal values and there was no chance of freezing that line and the system has been operating normally ever since. And we never had to talk to PJ again in the night and we didn't get any more alarms. We always have a deal going on the planning shift on who's going to wake up the crew and no planning team likes to wake up the crew. This was one we couldn't avert. It was a failure and there was no way for us to change limits on the ground and prevent that alarm from going off. This morning, if any of you were listening to the air to ground, we played "F Troop" as the wake up call for the crew. The significance of F Troop is that this crew in their training cycle has been the F crew since the beginning of the Shuttle training cycle. We don't name crews anymore A, B, C, D, E, F but in the early part of the training cycle this was the F crew and they took up that name and we just played the theme song from the old TV series F Troop for

them this morning. And if any of you have seen some of the crew pictures that were made preflight with them in their F Troop uniforms it's really an interesting picture with the sabres and the hats and what have you. This morning the planning team got to do some executing. We didn't have to get off just as soon as the crew woke up this morning. And as usual the crew was up and at them and getting ahead of the timeline. About an hour after wakeup the commander called down and asked if it'd be alright if they stayed on the timeline if they could go out the hatch early. We told them that was fine with us. If they could get out an hour early it would put it right over the states and we could have good TV of the egress out of the hatch. When I left the control center they weren't quite an hour ahead. They were ahead on some things and right on the timeline on others. At this time I don't know whether they're going to get out of the hatch a little bit early or not. But everything is going normally. The suits are performing well and the TV that I saw when I walked in the room indicated that they had begun the prebreathe operation hanging on the wall in the airlock in the suits. We had a building problem early this morning that I'm sure some of you have heard about. Let me briefly run over what it was. The mission operations computer, the MOC that processes the telemetry to our displays had some sort of software fault and stopped processing. It was over the first stateside pass after crew wakeup so it was kind of a nuisance to us. There was really no real problem to us in operating the spacecraft. We still had S-band voice, UHF voice, all of our stripchart recorders still worked and we could get selected readouts out of the incoming telemetry stream. We just lost the sophisticated data processing system that gives us our digital displays. We were down for about 19 minutes before we got the MOC reloaded with a new software mode and back up and operating. We lost about 10 minutes of site coverage to this problem. 5 minutes I believe at Bermuda and Mila and another five minutes at the next station. I don't remember which station that was. But we lost a total of 10 minutes, 10 minutes of real time data. After that I requested that we bring up the dynamic standby computer that was scheduled to support the EVA just a few minutes early just so we didn't have any more incidents like this during the EVA prep. And I know I've talked in one of the previous handover briefings about the dynamic standby computer that we bring up for every critical period and this was just the time to bring it up. We brought it up a few minutes early since we had the MOC problem. There has been no more problems, had been no more problems since I left the control center. Today's activities are primarily EVA and post EVA work with the suits. After the EVA is over today we'll recharge the suits backpacks to be ready to support a contingency EVA should it become necessary. And that's just a safety precaution. These suits are onboard primarily to support contingency operations on closing the payload bay doors and

latching latches should they fail in the entry prep timeframe. So we're getting the suits back ready to support such a contingency if it arises. There is one payload activity that will be continuing today and that's the GAS cannister 0 0 5. That's the Japanese newspaper snow manufacturing experiment. I meant to write down what time it was going to be initiated but I didn't do that. But some time this morning it will be turned on and we're going to be making snow in space. That's constrained in a can, it's not in the cabin. We completed the radiation monitoring experiment early this morning and the team of folks here supporting that experiment asked us to read up a statement to the crew thanking them for their outstanding performance on that experiment and we did that this morning and it was appreciated by the crew. I believe I have covered all of the things that happened to us in the night. If there are any questions I'll be glad to answer them.

PAO Sylvan Rodriguez.

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STONE ...the statement to the crew thanking them for their outstanding performance on that experiment and we did that this morning and it was appreciated by the crew. I believe I have covered all of the things that happened to us in the night. If there are any questions, I'll be glad to answer them.

PAO Sylvan Rodriguez.

SYLVAN RODRIGUEZ (KTRK) Is there any concern that Story may be over exerting himself. Did he get plenty of rest last night?

STONE I don't believe you can over exert Story. (Laughter).

RODRIGUEZ Did he get plenty of rest last night? Did he sleep? We had one report that he didn't sleep much.

STONE I don't know where you got that report. In the Control Center the only disturbance we had was the alarm about an hour after go-to-bed time. We didn't see any activity in the cabin and we can normally tell when a crewmen's up and we saw no activity in the cabin until wake up time this morning so I have no reason to believe that he didn't sleep well.

PAO Jules Bergman.

BERGMAN In the absence of Story's moving though, can you really tell whether he was sleeping?

STONE No, we can't tell whether a crewmen's sleeping or not.

BERGMAN Because it is my information that he didn't sleep first night, second night and let's see last night was the third night was it or was it my third night?

STONE Jules, you must have different sources of information than I do because I have not heard that.

BERGMAN All right, I agree with your judgement that you can't over exert Story.

STONE When you listen to him on the loop, he sounds great, he's still excited over being in space and he's still excited about doing an EVA today. I'm not sure how much sleeping I'd be doing if I was doing such an exciting thing as these folks are doing. But, as far as I know, the crew is sleeping as well as any crew sleeps in space.

PAO Yes sir, right there.

HERB CHAPMAN (ABC News) Just to clarify what you said about recharging the units after use. How long does that take? When would it be possible to use them again if they were absolutely needed?

STONE They could be reused again immediately. We don't use them all the way down. It's just a precaution, precautionary to get them full up so we have the full, full EVA duration capability. It doesn't take very long to recharge them. I'm not sure of the time. The water recharges probably on the order of 45 minutes and I don't know what the O2 recharge is.

CHAPMAN How long is their normal capability in one stretch?

STONE Normal EVA is up to about 3 hours and they can extend longer than that. About 3 hours is what we try to achieve.

PAO Yes sir.

STEVE (GARBLE) (MPR) How much early would the EVA have to begin to affect TV time?

STONE To get coverage of opening the hatch, about an hour early. Puts you right over the States, right over Mila which is one of our TV sites.

STEVE Would an early EVA, it wouldn't affect other TV times at all would it?

STONE No, it would not.

PAO Lynn Sherr.

LYNN SHERR (ABC News) Two questions. One, can you tell me exactly what time they went into the airlock and two, can you clarify which suit Story is in? Is he in the one that was the backup originally?

STONE I can answer the second question. He is in the suit that was originally the backup. That's the prime suit now. As to when he went into the airlock, that was going on when I was leaving and I don't know the time. It was, it hasn't been very long ago. We saw them on TV when I was walking over here. I don't know the time.

SHERR And, I'm sorry. Just to follow up. Then, the current backup suit which was originally Story's prime suit is, is stowed where right now?

STONE I'm not sure Lynn where they moved it to. It's not in the airlock because it's just too crowded in there. It's someplace on the middeck. I'm not sure where it's strapped down.

SHERR Thank you.

PAO Paul Recer.

PAUL RECER How did the batteries, battery thing, sort out so far as the batteries that supply the headlights.

STONE The EVA light batteries? As near as I can tell we, after testing the batteries yesterday we found 4 batteries that were not good. It takes 2 batteries for each headset, for each helmet to run the lights. I'd like to point out that these light are not required, or not mandatory for this planned EVA or a contingency EVA. We'd like to use them to see what their lighting capability really is but they're not mandatory for the EVA today. As far as I know, each helmet has 2 good batteries in it at this time. The normal configuration is to run 1 light on each side of the helmet. There's 2 lights on each side of the helmet. Normal configuration is to run 1 light on each side of the helmet and that would give you about 6 hours duration on those 2 batteries that are on the helmet. So we've got plenty of batteries to do whatever we want to do with the lights.

RECER Let me make sure I understand. We were told earlier it took 4 batteries per helmet and ...

STONE I believe the, that was just an error. I didn't, I heard that that had been passed and I went and drew me a picture to make sure that I knew how many batteries were in the helmet and there's 1 battery on each side of the helmet, 1 battery associated with each pair of lights.

PAO Right there right behind Paul.

RUDY ABRAHMSON (LA Times) What did you decide to do about taking pictures of the tile or insulation damage?

STONE There's no planned picture taking of the OMS POD.

PAO Morton Dean.

MORTON DEAN Just getting back to the batteries for a moment, were those checked out and did they check out properly before the flight and who's responsible for the batteries ultimately, the manufacturer or NASA?

STONE I don't know who, you know, to place responsibility for those batteries. They were checked out in February and I

don't have the exact date. I wrote it down on a piece of paper but I don't see it here now. They were checked out in February and they have an extended shelf life so we would have expected them to be still good.

DEAN Who is ultimately responsible then for the final checkout - NASA or the manufacturer of the suit or the batteries manufacturer?

STONE I don't know the answer to that question. NASA is ultimately responsible for what we fly so I assume that NASA's responsible for the checkout of those batteries. I'm sure based on the fact that we have found some that are not working we're going to reevaluate what the real shelf life of these batteries are. I mean it's not like going to the drug store and buying a duracell. These are fairly sophisticated batteries and we're still on a learning curve with them.

DEAN Can they be switched out from one helmet to the other maybe?

STONE Oh yea. We have spares, spare batteries. Are you talking about while we're doing EVA?

DEAN No, before you do the EVA.

STONE Oh, certainly. We've got, you know we've got a stack of batteries that we can put in the helmets so yes. There are, let's see, 7 good batteries onboard if my arithmetic is right and we can use them in any helmet and any configuration we like.

DEAN Did, just one more question on this. General Abrahamson had said that there was the most thorough checkout of the suits. Everybody at the Cape was enthusing that the suit was just going to operate perfectly.

STONE And the suit...

DEAN ... that nothing had ever...

STONE is operating perfectly.

DEAN Well, but really, the battery's a part of the suit.

STONE It was a very thorough checkout and, you know, obviously there's something about the shelf life of these batteries that we're still learning.

PAO Yes sir.

JERRY HANA (Time Magazine) Follow up on this line of questioning. How many batteries are onboard the Challenger and how many should be onboard the Challenger, and what type of battery is it. Is it alkaline, or lithium hydroxide or what please?

STONE The manifest says there's 12 batteries onboard the spacecraft. It's my understanding we have found 11 of those batteries. (laughter) And that's not altogether unusual when you've got 4 guys in a, in tight quarters and the stowage lockers - once you start moving, taking these well-packed stowage lockers out of their drawers, things get moved around in the spacecraft a little bit and sometimes you do misplace things. On the last flight we never found some coffee that was truly stored on the spacecraft.

PAO Garble.

HANA Jerry Hana from Time here again. Again, are these lithium hydroxide? What is the...

STONE I don't believe they're lithium hydroxide but I, we can find out for you.

HANA Could you take that question please?

STONE We'll get it for you. In fact I suspect if we call over there in to the EVA console we can, we can get an answer before the end of this conference.

PAO Yea, we'll verify it.

STONE They're a lithium battery but it's...

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...are these lithium hydroxide. What is the (garble).

RANDY STONE I don't believe they're lithium hydroxide, but we can find out for you. We'll get it for you. In fact, I suspect if we call over there to the EVA console we can get an answer before the end of this conference. They are a lithium battery but I don't believe it's lithium hydroxide. I believe it's another component.

PAO Okay. Carlos Byars, then we'll go to - - has Kennedy got questions. Do any of you know? Yeah. We'll go to Kennedy after (garble).

CARLOS BYARS (Houston Chronicle) I got lost in all the batteries and forgot what I was asking. How's the crew eating? How are they doing on the groceries. Any comments about food? I haven't heard anything.

RANDY STONE The only comment I've heard about food is, Story said he ate a couple of bananas the other night, and that's the only comment about food. We see the food warmer come on at every meal period, so somebody's eating food.

CARLOS BYARS Did they take any jalepinos along this time?

RANDY STONE I doubt if I'd know if they did.

PAO Okay. We'll go to Kennedy and come back here to Houston.

REG TURNELL (BBC) A couple of EVA questions. We were told yesterday they were going to attempt to take a picture of the damaged quilt on the OMS pod. Have they now been told not to attempt that?

RANDY STONE We did some simulation yesterday to look at the most efficient way to do that photography. It's my understanding, and I was not a party to the final management discussions regarding that, that we were not to tell, direct the crew to go take those photographs. We don't believe there's any real requirement to do that. But, they have not been directed not to take a picture of it and they'll, I'm sure they'll point the cameras up in that vicinity, but they're not going to do anything that I know of to overtly go up there and take a picture of the OMS pod.

REG TURNELL But is there a choice if they think they can do it, presumably? It's their choice is it, to do it if they wish to.

RANDY STONE That hasn't been a discussion. I assume that P.J. is the commander and he will make that decision if he thinks it's a prudent thing to do, but we have not directed them to take a picture of the OMS pod.

REG TURNELL My other question was about the windows. I heard some discussion of taking pictures of the windows and I wasn't sure whether that related to picture taking during the EVA.

RANDY STONE No. It does not relate to picture taking during the EVA. I believe the comments you heard this morning was that P.J. would like to do a survey, a photographic survey of the windows just to get a baseline of what they look like onorbit and then we'll take another baseline of the visibility through them after we get on the ground. It was just an engineering interest set of photography that he would like to do. He did note, I believe, this morning that he thought he saw some small areas of frost on the window down at the base of it. It was not a visibility problem. It's something that has been seen before and it was just a curiosity thing he asked us about and said he was going to take a picture of it.

FRED JACINTO (Today in Cocoa) Earlier in the flight, there had been some reports of a cabin overpressure associated with the sleep period, post-, presleep period. Was that problem ever resolved and if so what was that resolution.

RANDY STONE Well, the way we resolved it last night is that we actually secured the pressure control system in the spacecraft to prevent us from getting a nuisance alarm. I don't believe the whole story is in on what's causing the high flow that we have seen at a couple of times in both presleep and postsleep activity. It's associated with the 14.7 psi cabin regs on the control system and we're still looking. It's not a problem. We're going to operate today in the normal control mode, automatic control mode with those regulators open through the EVA. We secured the cabin last night just to prevent a nuisance alarm while they were sleeping.

JOHN PINE (Reuters News Agency) I don't know if you know the answer to this, but how deeply has Musgrave been involved in the development of the suits and the second point, looking at his accomplishments, how long does he normally sleep when he's on the Earth?

RANDY STONE Story has been involved in the suits, these shuttle suits since the beginning of the design. He probably has more time in these suits than any other crewman or test subject here at NASA. With respect to your other question, after reading his many accomplishments I don't see how he ever had time to sleep.

PAO Okay. That's it for KSC. Anything back here at Houston before we go to White Sands. Lynn Sherr.

LYNN SHERR (ABC) I don't know if you know the answer to this but do Story and Peterson have, do you know what they plan to do during the prebreathing time for 3-1/2 hours while they're in there?

RANDY STONE One of the original suggestions was sleep. There's not a whole lot you can do hanging on the wall of the airlock.

LYNN SHERR Do they take anything in there with them that you know of? A book or anything at all.

RANDY STONE Nothing that I know of Lynn.

GEOFFREY LEAVENWORTH (Time Magazine) The astronauts last night were told that the TDRSS satellite thruster firings would be not until Sunday after they got back. On your shift did they make any further inquiries about that?

RANDY STONE No. We haven't discussed the situation with the TDRSS this morning. They may have since I have left the control center but we didn't here in the early morning.

PAO Okay. We've got one more question here in Houston and then we're going to go to the White Sands briefing.

MIKE WILLIAMSON (KJOJ FM) I was wondering - - On the last flight they had planned to put a mini cam on one of the helmets. Is that mini cam going to be on the helmet this time too?

RANDY STONE I don't believe the TV camera is being flown this flight and we can verify that, but I don't believe - - the helmet camera is not being flown this flight.

PAO Okay. Thank you Randy. Now we are going to go to White Sands for the TDRSS briefing. I understand that audio to the space port is a little less than crisp and we are compelled to ask you to please speak slowly, clearly, and distinctly. You see here Bob Aller, Program Director for TDRSS and George Harris, Lead Flight Director for Space Comm.

ALLER Good morning ladies and gentlemen from cold and snowy White Sands, New Mexico. We are in a stable condition this morning as we have been the last couple of days and I'll ask George Harris here with me to describe what's gone on in the last 24 hours.

GEORGE HARRIS I have just come off shift and the spacecraft, as Bob says, is in a stable mode and the condition of the spacecraft is green and go at this time. We have established during the night a sun control mode for the attitude system which necessitated uplinking a series of commands to 1) establish the sun mode and 2) switch off the A side control logic for the roll system and switch on the B side logic for the control system. We implemented the sun control plan and followed it throughout the orbit where it responded correctly to the sun sensor's signals. During the night, we also went through an eclipse. This eclipse was of interest because of the new sun mode control that we had instigated for the attitude system. The eclipse worked perfectly. The power system responded as expected. The temperatures were normal for the procedure that we followed and in general, we came out of the eclipse at the correct time with the sun on the solar panels and we went back to solar power. We also during the night defined a ground support plan with the Goddard Space Flight Center for the use of the G-staden and we coordinated this with the orbiter flight director to insure there was no conflict for the shuttle activities that would be followed during

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GEORGE HARRIS We also during the night defined a ground support plan with the Goddard Spaceflight Center for the use of the G staden and we coordinated this with the Orbiter flight director to insure there was no conflict for the Shuttle activities that would be followed during this day. We worked throughout the night with the Orroral station in Australia and Hawaii who provided excellent support in our activities. We also established a state of health monitoring schedule for the spacecraft which is currently in effect and we have collected during the night data that will be reviewed and analyzed for the people who are our dynamic specialists. At this time we feel that the spacecraft is in a very stable and comfortable condition and is responding very well to the ground controllers. We're going to take time during the coming day to continue with our state of health monitoring and start implementing our normal routine operating procedures. It gives us a chance during this orbit to have a look at how the battery management procedures are working, how our study of state of health management is taking effect and also how the ACS mode control is working on the spacecraft. We'll also be bringing up the 20 foot antenna at White Sands and testing the system with the downlink from TDRSS. And this will provide additional coverage during the time the spacecraft is over the United States. So at this time we feel that TDRSS is behaving very well in its orbit and we have a good control and the team feels pretty confident with the spacecraft and its activities as scheduled for the next 24 hours.

ALLER George, Ijust might take a minute here to describe that attitude that we're in. The so called sun oriented mode. Will you activate the speaker. The spacecraft, if the camera is the sun, the spacecraft mode currently is this type of role. With the solar arrays always pointed toward the sun. That's the sun control mode. The only thing we're doing differently when we go into an eclipse we deactivate sun sensors that are on the solar arrays that sense the sun and we basically have deactivated the control system and it continues to roll in this direction. I think we're ready to take any question that anyone might have at this time.

PAO Are you taking them there or are you coming to KSC? to JSC? Okay, this is JSC, in the front row here.

HERB CHAPMAN ABC NEWS We have earlier had described to us a potential system tc revive the satellite that would involve three hours of daily firing of its control jets over a six or seven day period. Would you bring us up to date on where you stand with that? Whether that still is a brief summary of the plan of action and when you expect to put it into effect?

ALLER Oh, yes, that remains our general plan. We have delayed the implementation of that while we evaluate the present attitude situation and particularly the roll situation. We have noticed some dynamics in roll that we do not completely understand at this time and since we are in a perfectly stable condition we're going to remain in the sun orientation while our Spacecom and TRW evaluate the roll conditions. We've set up a major team at Redondo Beach on the west coast as well as here to study the roll dynamics of the spacecraft. We are continuing with a plan for modifying the orbit and I can give you the basic content of that plan as we reviewed it yesterday. It will actually be a series of maneuvers that will extend over approximately a 14 day period in which we will burn around apogee for a period up to three hours at a time. During that type of maneuver the spacecraft would be in an Earth oriented mode where this side of the spacecraft would be pointed toward the Earth and the thrusters on the side of the spacecraft would move the spacecraft in the direction of the orbit, like this. And those burns, as I say, would last roughly 2 to 3 hours at a time. We would do that each day over about a two week period. That plan is continuing in development. We presently feel we will implement that plan some time in the next week or so.

PAO Sapcom 213. Lynn Sheer ABC.

LYNN SHEER ABC Mr. Aller, are there any, will any of the communications with the TDRSS affect the EVA in any way? Yesterday I know there were times when there could not be spacecraft communication. Will that happen today?

ALLER No, the TDRSS is not active with the Shuttle in any way.

LYNN SHEER If I could follow up. I thought the idea was that yesterday they were not permitted to communicate over certain passes, like Orroral because you were using that for the TDRSS. Will that happen today while they are outside the spacecraft?

ALLER I'm not familiar with the station coverage for the EVA today. I understand what you mean now, of course, when we're over a station and the Shuttle's over a station we have to share the resources of that station. That's one of the reasons we'd like to get TDRSS in orbit so we can avoid those kinds of conflicts. However, I'm sure that there's not going to be any interruption in communication during EVA today because of TDRSS.

PAO Bergman.

JULES BERGMAN ABC NEWS Bob, excuse me, when is the earliest TDRSS might start these maneuvers and secondly, when did you discover that it was in a roll?

ALLER We put it in a roll. We didn't discover it. It was in there. That is the most stable condition of the spacecraft. We know most about that condition and that's why it's been selected. As I said earlier, we are continuing to develop the plan. We have basically the plan in hand, the one I just described, we're going to implement that plan when we have thoroughly and carefully evaluated the roll dynamics associated with the spacecraft. Time is on our side. There is no need to correct the orbit at this time. The spacecraft is healthy and we want to insure that we fully understand the situation before we begin implementing those maneuvers.

BERGMAN We were told last night that you would commence the firing of the thrusters on Sunday night, is that still a good number or a good date?

ALLER No it isn't Jules. I don't believe that we would initiate these maneuvers that soon at all. As I said, I don't believe we will implement the plan in less than a week, possibly two weeks.

PAO Gentleman right back here.

JEFF SMITH SCIENCE MAGAZINE If you deliberately put it into this roll what is unknown about the roll dynamics? What is the uncertainty that you are now investigating and could you explain that some more please? Also, would you say whether you intend to use the same amount of fuel as you had predicted yesterday or the day before given that you have a 14 day burn which is slightly longer that we were told earlier?

ALLER Let me answer the latter part of the question first. It's easier. The amount of fuel remains about 850 lbs. And we have just extended the burn, the number of days to optimize these maneuvers. We are adding about 1100 feet per second to the orbit with these maneuvers and it would be a 14 day sequence in the plan we reviewed yesterday. This may be modified slightly over the next two weeks as we optimize the plan. The roll situation is, yesterday morning you may recall on a couple of occasions, we noticed some dynamics in the roll, the actions of the roll thrusters that we don't fully understand at this time. And we have set the spacecraft in this sun mode to minimize the activity of the roll thrusters. And while we're in this mode we are evaluating what we have seen thus far in the

performance of our roll thrusters. There are four roll thrusters that are on the bottom side of the spacecraft, an A side and a B side. We are currently on the B side.

CRAIG COVAULT AVIATION WEEK You said you would plan to add about 1,100 feet per second. Does that still hold for about 300

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... performance of our roll thrusters. There are 4 roll thrusters that are on the bottom side of the spacecraft, an a-side and a b-side. We are currently on the b-side.

CRAIG COVAULT (Aviation Week) You said you had planned to add about 1,100 feet per second. Does that still hold for about 300 feet per second for each maneuver itself?

ALLER No, Craig. It's correct that the velocity we need to add is about 1131 feet per second from the plan we reviewed yesterday. On this particular plan, the delta-V we were adding each day - the first day was 108 feet per second, the second day was 100 feet per second and the third day 95 feet per second - roughly in that neighborhood.

COVAULT Okay, and then a more general question. I can recall 10 years ago almost to the day you were involved in another spacecraft rescue and here we are 1983, 10 years since Skylab. Have you given any short thoughts to that coincidence?

ALLER Craig, I really haven't had time to think back 10 years. I'm very optimistic that we will be as successful with this operation as we were with Skylab.

PAO Carlos Byars, Houston Chronicle.

CARLOS BYARS Bob, as I, have I missed something somewhere. You say you have about 800 pounds of fuel remaining and I seem to recall you started with 1300. I see a head shake there. Are my figures crouched up? Would you correct me?

ALLER What I said was we would take about 850 pounds to, of the fuel to perform these maneuvers. As far as I know, we still have in excess of 1200 pounds on board and George confirms that.

BYARS Sorry, I just misunderstood.

LEE DEMBART (LA Times) Bob, is it still your view that this is going to be completely successful and TDRSS will wind up exactly where you wanted it in the first place?

ALLER Yes, that's my view. We've come a long way, I think. It's been a marvelous operation by the Goddard Space Flight Center as well as the team here at White Sands. We have a long way to go and it's going to take probably a month or so to get there. But, as George has just described, the systems are in good shape. We have one anomaly that we're working now which is this roll thruster anomaly but I'm optimistic we're going to understand that and proceed to regain our nominal orbit.

JEFF SMITH (Science Magazine) Will the checkout, the 90 day checkout period that you had planned earlier, will that be pushed back while you work on the orbit problem or will it be delayed in any way? And, what are the ultimate implications of this problem for the schedule?

ALLER I can't answer the latter question. Frankly, I have not had time to worry about the follow on schedules at this point. Our checkout schedule, we will proceed to check out those elements of the spacecraft that we can within the conditions we're going to be in which is the sun orientation. And, I believe Goddard and Spacecom will continue to evaluate that checkout plan. We are, we have already accomplished many of the spacecraft checkout elements in the maneuvers we've gone through this past week.

PAO The gentlemen in the rear here.

DOUG MILLER (KTRH) Given the extended length of your burns, can you still assure us that you'll have enough fuel to keep the TDRSS in operation for its projected 10 year life?

ALLER I believe in the situation we're in I wouldn't want to try to assure anybody of anything. We are in a, we have been through a very critical emergency. We've come out of it in pretty good shape. We have a stable, healthy spacecraft as best we can determine. The plan I just described would provide adequate fuel after we reach the nominal orbit and I see no reason today that we should not have adequate fuel to perform our mission.

PAO Carlos Byars, Houston Chronicle.

BYARS Have you got, is there anyway to tell what might have caused this anomaly with the thrusters. It's my understanding that those are located in the area where the, where the TDRSS was attached to the IUS. Could, was there, is there any indication that the thrusters were physically bumped, banged, damaged during the separation or subsequent to that?

ALLER You're right. These 4 thrusters are on the bottom side of the spacecraft that were at the separation plane and protrude slightly below the plane. It's pure conjecture of any situation we have right now. As I say, the TRW specialists are evaluating where we are. We have the b-side operating which are 2 of the 4 thrusters and they have operated now for the past, we've been on this b-side for the past several hours with no problems. We do not know what the specific problem with the roll thrusting or the roll dynamics are at this time and it'd just be conjecture on my part to assume anything else.

BYARS I take it the 2 that you have a problem with are on the a-side.

ALLER No, that's not, that's not correct. We had 1 of the a-thrusters that we were concerned about early yesterday morning. That is why we have deactivated that side.

BYARS I'm getting more confused apparently by the moment. You have 4 thrusters 2 - a and 2 - b, is that correct?

ALLER They're in pairs, that's right. There's an a-side and a b-side. You need one side to control rolls. Yesterday morning we were on the a-side. We noticed this dynamics problem. We related it to one of those 2 a-side thrusters. We have deactivated the a-thrusters and we are on the b-thrusters.

PAO Prior to moving on to Kennedy Space Center, I have a short anouncement to make for the battery lovers. It's lithium bromide batteries in the helmets and now we'll go to KSC for questions.

(Garble) from Today in Cocoa. One question is are there any indications yet if the IUS problem can be corrected in time to launch TDRS-B in August?

ALLER I have no information here on the IUS problem. I'm sorry I can't answer that.

DOOLING Dave Dooling with the Huntsville Times. I want to make sure that I understood something correctly from an earlier briefing that the orbit you're going for to circularlize is not quite geostationary. In other words, when you get finished with this series of circularization maneuvers you're going to be a few hundred miles below the 22,335 geostationary. Am I correct?

ALLER We talked about that a little bit yesterday. The way these maneuvers have been designed, the ones I described as a 14 day sequence, they are designed to end up with an orbit that is totally geosynchronous with the spacecraft at the roughly 74 degrees west where we would want it for checkout. So the maneuvers are being designed such that the entire orbit would be in, would be adjusted to the 22 3 geosynchronous altitude.

DOOLING Okay, then I must have had a semantic problem with that earlier. Okay now, when you're referring to the thrusters on the a-side and b-side, are these individual thrusters or are you referring to the dual thruster modules in which TRW packages these things?

ALLER I'm sorry I don't have a very, very viewable prop here but I'm pointing to 2 thrusters at this point and 2 thrusters at this point. One of those is an a-thruster, one is a b-thruster and the same below. One is an a, one is a b. We have the b-side so we have a b-thruster here and a b-thruster here that are activated.

DOOLING Okay, thank you.

PAO Thank you very much.

END OF TAPE

PAO Well good evening and welcome to our change of shift press conference, we have off-going Flight Director Harold Draughon with us who was on duty during the EVA shift today and to his right is Bill Fisher, a member of our Astronaut Corp, who's a specialist in spacesuits and was there closely following the spacewalk today and can talk more specifically about that. We'll go ahead and start with Harold.

DRAUGHON Okay, today's activities, the focal points certainly was the EVA but there were a few other things that went on and I'll cover those first to get them out of the way and then come back and go through those EVA-related activities. We had one GAS can activation today and that was accomplished on time. You've heard on some previous shift debriefings some references to the general housekeeping kind of functions we've been doing on cleaning cabin fans and IMU fans, we extended that coverage today to include the CRTs onboard, there were 2 boxes a thing called a DEU and a DU, it's the CRT box and an electronics box that supports that. They are a little more difficult to get to but are accessible. Paul Weitz took on that task while part of the EVA preparations were going on and it took a little longer then we expected but it turned out to be a very worthwhile task, so it was a fair amount of blockage on the screen so he cleaned all three of the DEU and DU filter inlets. That's something we'll be looking at and seeing how often we want to reschedule that on further flights. The other data has been coming out during the flight on the amount of accumulation that KSC's been finding on these and other filters in the turnaround and it's not surprising on the first flight of the vehicle that we find some loose parts that have accummulated during manufacturing. It was a little more than we had anticipated, and for those of you that were here for flight one, you will recall, that we had specifically scheduled time set aside time, on flight 1 to go in and clean those filters. So that was done today and was accomplished but it did take a little bit of time longer than what we had anticipated. Most of you probably are aware that the President had scheduled up a pass today to talk to the crew, that was just prior to the going EVA near the end of the prebreathe and that came off rather well. We had some small problems with COMM today which is also the case with the EVA, or seems to be, it seems to have more difficulty in the EVA there, you have less control of it with the crewmen locked up in the suits and the modes that you have, all the relay modes that you have where crewmen are talking from the suits to the Orbiter and then the orbiter's around and what not. At one time we found that the teleprinter was putting a tone on one of the downlinks so we cycled the power on the teleprinter system and it reset so much, that evidently, or I don't know exactly why yet, but that did clear the up problem and the tone went away. All during the EVA, or quite a large percentage of the EVA, all of the voice that we would say to, transmit to the crew, would be turned around and come back down to us as an echo, any of you that's worked single side band or

off ships probably have experienced the same thing. You tend to say something and pause because you hear yourself coming back at you or after you've mentally conditioned yourself to ignore that, it's not really a problem if you're very experienced in doing this kind of work and talking on headsets. So we elected not to troubleshoot that since it was something that you could mentally just block out and it really wasn't an impediment to carrying on our dialogue with the crew. We did run a few COMM checks after the completion of the EVA, they did not isolate whatever that problem was, and right now there is some people working on some checks to do after landing to try to get in and find out what that COMM configuration problem is before the configuration is changed and perhaps mask that thing from us. So that's going on, we don't know what the difficulty was, it was very clear echo, it was exactly what you'd say it would come back to you on several DV down but it was very intelligable and very clear. I'm trying to look through here and see what else that is not EVA related, we had one camera in the bay that had an overtemp indication and the bay cameras do that periodically, and it's a straight-forward thing we get a message, it tells us that some camera's overtemp, the crew cycles through them and figures out which one it is and we power it off, and let it cool down and then use it again, that's happened on other flights. We did a rendezvous burn, rendezvous burn number 4 this evening it was done just a short while ago. It was a 9 foot per second burn and the obit after the burn was 153 x 148 nautical miles. We took, that was primarily a retrograde burn took a little bit of an (garble) out of the orbit. Nothing significant about the burn itself. During the burn it was done, as I said, with the 4 RCS jets, you maintain attitude control with, of course, with the other jets while the burn's going on and a jet that had previously leaked, L2D left jet manifold 2 down-firing jet, starting to leaking again. We closed it during one pass just to get a reading on the decay rate of that jet, the on controllers got that, we assessed how much of a leak, how much we could leak over night if we elected to leave that jet online or in fact leave that whole manifold online and it's something like 9/10 of a pound. That poses essentially no problem at all to us and rather than close the manifold, there are manifold valves at the end, to the manifold that you could shut off all the total manifolds on that side and secure that leak and it wouldn't be leaking anymore, but rather than do that, we elected to leave that online and if you do close it off with the leak still there, the pressure that's in the manifold will leak out and if it gets low enough it's kind of an involved procedure to bring to pressurize that manifold and bring it back up. It gets down to a particular pressure range that's sensitive to hitting it with full pressure by just opening the manifold valves back up again, you get a big pressure surge. So there is an intricate procedure of, what they call a stage prepress, you'll lock up a little bit of pressure, open up the valve, a down stream valve, put a little pressure in, close that one, open up another one in, lockup a little bit, and it's a

procedure you'd rather avoid if you can, but if you need to use it we have it and we have used a version of that on some previous flights. But rather then sign up of that, by securing the manifold we're elected to leave it online. If the leak were to get larger, and it would have to get something like 100 times larger than it is, before it would even alert the crew to it, the crew would get an alarm, wake up, close the manifold and it still would not be a problem. We don't have any expectation that that would happen or we wouldn't have left it opened. We had a, one other problem that I believe that Randy talked to you about on the last, I assume the one he talked to you on the last debriefing and that is the MOC computer in the Control Center stopped cycling after the EVA, it was about 30 minutes after the EVA. On this occasion we had up a dynamic standby computer, that's something we do, we have 2 computers online running in parallel for critical phases and you could easily argue that EVAs are not that critical in the sense that entry and ascent are critical, but we do for rendezvous maneuver burns, EVAs. Those kinds of activities we'll bring up a dynamic standby machine, we had one up today for the EVA and had not turned it down yet when the online machine went down, and there's an automatic switchover function that goes on and it refills directly up to the standby and there was no impact at all to the mission support. The one that Randy had earlier today was prior to bringing up the MOC that the dynamic Rad to standby, so we had a short outage of support there. I do not know yet what the cause of that was, it was, as I said after the EVA and the guys are still looking at what could of precipitated that problem. With regards to the EVA, the prebreathe was started at about 22 hours and 53 minutes on this flight date. Everything was really smooth during the EVA, the prebreathe went well, getting the checkout done into their suits. We started out with what we thought a little bit ahead when I came in this morning, about the time we were generally getting 30 minutes from prebreathe it became obvious though that more than being an hour or so ahead like I first thought we were, we were really right on time.

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DRAUGHON We're pretty much on time and that remains the case for the entire EVA, I think at the end of the EVA there were a couple of things that Story hadn't got completed at that pass and it would have been the last pass of the EVA and we gave P.J. an advisory that if he wanted to, he could extend the EVA up to about 50 minutes more to complete all the nominal activities and anything else that he might want to consider from a shopping list standpoint. And they finished out their planned activity and I think they were within 7,8, 12 minutes of being right on time in terminating the EVA. It was really a clockwork procedure. We thought it went very well. The biomed instrumentation worked well today on the EVAs. That's something that we've been striving to get going good. There were a few things that are worth noting. The foot restraint holddowns, there's a bracket that holds the foot restraints in a particular orientation, they had some difficulty in releasing that bracket and if you want to pursue that, Bill was the one that found that those things were snugged pretty tight at the Cape and we had a special expert onboard to treat that problem if it came to be. So he could talk through that more throughly if you wanted to get into that. During the EVA, Peterson had a 02 use high alarm, that's an audible alarm much like a C&W system in the Orbiter and the O2 usage rates that we were seeing at that time were about 1.3 psi per minute. That alarm is, would be keyed, by a usage rate of something like 10 psi per minute. Clearly he was not using 02 at that rate, that would be an extremely high usage rate and the best guess, but that's all it is at this time, is that it was some sort of instrumentation get, a sparious instrumentation anomaly and it happened that one time and then was all, and there's no indication that we really had a flow of that magnitude. The DCM lights, these are the little modules that are on the crew's chest that they use to read the instrumentation parameters during the EVA, you've probably heard us reading, been reading those values on pressures and time remaining and power levels and voltages and those kinds of things. They reported that in sunlight when they were in bright sunlight, that that device was difficult to read. It's got a set of (garble) lights, much like the digital clocks and what not. And there is an intensity control there, but it was not adequate in a real bright light, they're difficult to read. I'm sure the people will go back and look at what needs to be done to make that more usable. In backing out of the EVA, when you open the hatch going out, there is a dump valve that you use, or a repress valve that has a position for dumping on to zero, a position for dumping on to 5 psi and then it has a close position and the crew uses that to dump to 5 psi, do some checks, and then dump it on to zero, and then when you come back in, you can bring it up to five and it's just used for controlling the pressure in the airlock, going up and coming down. When they, normally when you go out, and after you dump to zero, you put that valve back to the flat closed position so that when you come back in, you can just go to the repress position and pump the airlock back up. That valve was

not in the close position, it was still in the open position, the zero position, and when they went to flow, they airlock started coming back up with the high flow and was not obtaining the 5 psi and wasn't maintaining the pressure. Before we could even get a call to the crew on what to do with that, they detected that they had left that valve in on position and closed it and continued with the repress. We had discussed actions for that anomaly, not for leaving the valve in the on position, but for the ability to get the airlock back up. The things that you do normally are check those valves that are in the hatch itself, if those are indeed in the correct position, then you open the hatch back up, make sure you have a clean seal, clean the seals if they need it and make sure you have nothing in the door. Reclose it and pump it back up from there again. And those were the things that we were discussing when the crew found it out in the wrong position, secured it, and came right on up with it, so we'll probably add the current procedures do say put that valve in the close position after you've dumped it to zero and you've gone back out. We'll probably add another line in those procedures that are used once you come back in, which is a typical way of doing that is, add an item that says check, which means confirm, that something is in a position you should have already put it in. We didn't have that step, that line item in the procedures and I'm sure we'll add that in for the next flight. The only other one I've got is a report from P.J. just before I left shift that he had heard a noise about a minute after liftoff on the (garble) in the vehicle and that they had not discovered what it was and what that thing was, was on the inside the crew cabin, in the aft station on the portside, there's a TV monitor, it's what they use when they are looking at the TVs outside, selecting different cameras and looking at scenes. They are TV monitoring, they are just like we've been in the control center, similar to it. That things got a bracket on it that's mounted on the aft bulkhead within the crew compartment and it came demounted and was actually separated, the amount was 1/3 or 2/3 of an inch on the aft bulkhead. It's not a load carrying piece of structure. It's just something, it's attached to the wall, it's brand new, it's a recent development that happened just before we left. The planning team tonight will be looking at the implications of that and what if anything, to do with it. It is not major structure and I doubt that we'll do anything to it. Well that's all I have, I'll be glad to answer any questions that you might have.

PAO Okay, why don't we go ahead and take questions and Jules...

JULES BERGMAN ABC NEWS For either Harold or Bill Fisher, did Musgrave actually look at the FRISI on the OMS PODS when he was out, with the area that stuck up that way which had apparently torn lose?

DRAUGHON Right at the LOS once, I really don't know for sure which one way or the other but right just rear LOS one time, P.J. asked him something about the OMS POD and you saw him go past the cameras going up, so I suspect...

BERGMAN Sure look like he was headed up there.

DRAUGHON Yes, he was certainly headed that way when the signal went away. We didn't discuss with him afterwards, we had not given him any specific instructions to look or not to look. We had entertained the idea and decided not to ask him to go look but we also didn't think that, he knows what its safe to do or not safe to do and we didn't feel concerned enough about it to tell him that he didn't have permission to go anywhere near that area.

BERGMAN The reason why I asked is I'd heard Dr. Fisher was over in building 9A or building 5, testing out the appratus for doing that with, or the torsoe or the harnesses, and General Abrahamson, I'm told, was there this morning as well, doing the same thing. So it seemed like an obvious, and then the cameras sort of showed him doing it and knowing Story's irrepressible nature, I figured he must have done it.

FISHER Well we did evaluate it and General Abrahamson did bring the subject up, early on, and I think a lot of people probably thought about it, the reason that we didn't ask, didn't request that they go do it, is we couldn't figure out anything useful we could do with the data right now. You could go look at it and log it, I mean we just don't routinely do things just to write it down on paper and we couldn't think of anything else, Jules, that we'd use with that information on it, we couldn't repair it.

BERGMAN Follow up question. There was no kind of a ground-to-air debrief tonight?

DRAUGHON On the EVA?

BERGMAN Yes.

DRAUGHON No there was not.

PAO Okay, back here. Jerry.

Thank you. Jerry Hanafin, Time Magazine. Hal, a couple of points. One, would you care to augment, to lucidate and enhance your remarks that this was a very smooth EVA? Some good adjectives that we can use?

DRAUGHON I don't know that I have any better adjectives to use. It was quite a spectacular show. It was very smooth, the crew were quite well rehearsed, and obviously very prepared to do the tasks that we have set them, asked them to do. They went through them in a very timely fashion and the fact that they started right on time and in my records were within about 8 minutes of finishing some 3, 3 and a half hours later right on time, having completed everything we asked them to do. I think that speaks for itself.

HANAFIN Very good sir, and finally we were told that the prelaunch briefing at KSC, that on the ground we'd, that they would be in affect, on their own out there and that the ground would have only a log on their heartbeat, their pulse. You mentioned biomedical factors, that they worked okay. Well what other biomed factors are envolved here that we didn't know about, beyond the pulse?

DRAUGHON No, that's, (garble)

FISHER That's the only thing we have. There's a biomed device but it just gives you heartrate.

PAO Jeff.

JEFF LEVENWORTH TIME MAGAZINE Harold, what kind of things were found in the filters today? Any more screws, washers, or thumbtaks?

DRAUGHON That same general category, they were quite clogged, I think P.J. said on one of them it was like 90 percent clogged.

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DRAUGHON I bet it was (garble) and screws, various kinds of things. He didn't use the metal filings which was in one of the filters that we cleaned yesterday. But it was a general, same category of blue lint and what not. We've been taking some pictures of it and then is bringing those back prior to vacuuming it out.

PAO Mr. Kamero, go ahead.

KAMERO (garble). While there any comments by astronauts on (garble) space Shuttle, snow experiment?

DRAUGHON No there were not. They don't have very much insight to that other than the fact that they get the correct talkbacks when they initiate them and that they did them on time and start and terminate them on time and that's, they did comment on that, (garble) just recently, near the end of the day to make sure that they had terminated one of those runs and they confirmed that they had.

PAO Okay, right here.

JOHN KERRY NEWSWEEK MAGAZINE How would you assess Challenger's general performance so far?

DRAUGHON I think it's been excellent, in fact it's been outstanding. They, I think I stated earlier, a couple of days ago at one of these briefings, I had expected a few nuisance kind of problems, and I think we clearly, with the previous vehicle, had proven that the designs are sound. But you do always expect with a new vehicle some infant mortality in a new set of systems when you put this many new systems online at one time. I had expected some, some systems that required some babysitting to perhaps procedurally power them on and off, duty cycle them and help the heaters thermostatically control them and that kind of thing, because there had been some thermostats relocated, there has been some heater wraps in certain areas that have been changed, there's been some insolation that's been more or less removed from, as the design is evolved. That did not come about. We have one heater that is regging a little bit high, but other than that there has been nothing of note.

PAO Next row back, and over on the edge, there you go.

MARL SHARTRAN, NATIONAL SPACE INSTITUTE 2 questions. On what mission is the next EVA scheduled, and did Story Musgrave perform that twang?

FISHER Which twang? I better take that one. STS-11 is the next scheduled EVA mission. There'll be, if we keep the timeline that we have now, that would include the first demonstration of the manned manuevering unit flight. As far as

the twang goes, I think you're referring to the positioning between the 2 slidewires. We wanted very much to see that too, we've heard nothing about it. I assume he did it because they've completed the entire timeline, but I'm as much in the dark on that as you are.

PAO Paul Recer.

RECER By my memory and count, this is the 3rd time you've had some sort of difficulty, apparently unrelated with computers on the ground. And then you've had some communciations problems. Has this been an unusual number of ground-based problems, and if so does this indicate the equipment's aging, or is it all new and it hasn't been broken in, or is there some generic problem running thru it?

DRAUGHON I think there have been, I think your counting is right, there was a power supply failure on a piece of gear, I don't know if y'all knew about that one, there was one power supply failure on one piece of gear in the MOC, in the computer in the Control Center. And there have been 2 instances in the last 24 hours where the computers stopped processing or stopped giving us data. That is unusual for that computer complex. It's, but it's, I don't think you can say it's a big strike against it. Its only unusual in that departures from an awfully good record in the past. The IBM folks that keep that software processing, and write that software, and prepared in the flight support people that prepare it too, have a marvelous record in the past of the MOC computer staying up and doing their job, and they are an integral and very important part of the control center. Without it, you don't have much left to deal with. You've got stripchart recorders and voice, and that's it. They have an outstanding record of performance, it's only in comparison to that past record are the 2 failures worthy of note. The amount of backup and how quickly we can come back online though, they're not something that you really worry about. A break in telemetry processing, when you're just, in essence drilling holes in the sky, you know, you're just doing normal, routine functions. That's not a big deal that the computer goes down at an inopportune time, you take 15 minutes, maybe 20 minutes at worst, and bring the computer back up. For those periods when we know we've got something in the ground support as an integral part of accomplishing something on time, we could have done it on standby, which is what we had to do.

RECER Okay, but you use these for SIMS also, and you had 2 failures or 2 problems within 4 days. Is that consistent with the rate you experienced during SIMS?

DRAUGHON No it's not. We would have been paying attention to it, had we had that kind of rate on those computers, but, until I know, until we see some, they've both happened within the

last 24 hours, until we get some indication of what it was, they may have stemmed from one cause. Maybe only 1 root problem that's caused both of these outages. The characteristics were the same, they quit operating, so until we know what caused it, I really couldn't tell you whether it is a major problem or not.

RECER Okay, well has this prompted an attempt to find out, or investigate, or anything like this?

DRAUGHON Yes, there are people already working on that.

PAO Okay, Jules.

BERGMAN I wonder if Bill Fisher can stretch his mind a little and take a long look into the future, and maybe the other astronauts minds too, as you have talked with them. And tell us what, the kinds of things todays EVA may make possible in the future, outside of the solar-max mission.

FISHER One thing we're looking at, probably in the STS-17 time frame would be the demonstration that we could refuel satellites that were running low on propellant for manuevering. There's a proposal in work now, none of this is firmed up, we could make that demonstration on a flight in that time frame. And that type of on-orbit refueling capability would be something to add to our repertoire as well as the refueling or repairing of satellites as we're going to demonstrate on solar-max. But just from an Orbiter contingency standpoint, I think the fact that we've demonstrated that we can get out there in suits that work well and repair any little problems that might occur in the payload bay of the Orbiter during an orbit, and enhance mission success. If we have some minor problem with perhaps a Get-Away-Special, or something that just exists on the Orbiter itself, the guy can go out there, make necessary repairs, and I think that adds to the dimension and flexibility of the Orbiter. And I think we're limited to that type of activity until we end up in the Space Station era, which is probably a little ways off right now.

BERGMAN But, looking forward to the Space Station era, or error, as the case may be, you may be right for all I know. I'm no expert in pronunciation certainly. What kinds of things could astronauts such as yourself do in constructing Space Stations?

FISHER Well, there's been a lot work done on the formation and putting together of large structures in zero gravity. In fact, we've made several different centers around the country. Put forth proposals, and we've actually verified as much as we can in the water tank, the actual construction of large space facilities by several EVA means. But I think the fact that you would be actually putting together part of the space station you'd later be living in, is the kind of activity we'd be talking

about, as well as the ongoing maintenance and repair of that Space Station and perhaps other facilities in orbit while you're up there. You have to have that ability if you're going to have a Space Station, and I think we made a good step in that direction today.

BERGMAN I wonder if you'd care to comment whether the Russians truly have demonstrated that ability with SALYUT-7? They claim they've done an EVA, and they've shown a spooky picture showing a head out a hatch.

FISHER I don't know. I've seen the picture of the head in the hatch, I don't know what you're talking about, but I don't know much about what they've claimed to have done on SALYUT-7.

PAO Okay, let's take one more here then go to the other centers. Paul Recer.

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RECER You're mentioning a study underway for STS-17 looking at refueling satellites, you talking about transferring fluids from one, from the Shuttle to the satellite?

FISHER Yes, essentially so, yes.

FISHER Okay we've never dne it in our program.

RECER How will that be demonstrated, and will you actually refused the satellite or will you mearly transfer fluid of some sort from one vessel to another?

FISHER Well remember this is still in the proposal stage.

RECER I understand.

FISHER But the proposals that we're talking now deal with taking up a (gargle) model of the satellite, such as Landsat, which is up in orbit, not the actual satellite, but taking up a model that was used in the qualification testing and demonstrating that you could refuel that particular satellite. It would be identical in every way to a Landsat except it would be launched with the Orbiter. You would go EVA, assume you had brought that satellite into your payload bay. Make a refueling from Orbiter supplies and that would be the end of the demonstration.

RECER Refuel it from a tank in the cargo bay?

FISHER In the cargo bay that you've taken up, that's correct.

RECER Okay, has this equipment been developed or designed?

FISHER No, we're sort of in the preliminary design review stages right now, but nothing outside of the (garble) model for the Landsat, for the satellite in question has been built before the satellite ever went up, but as far as the actual material to do that, the only thing that we have put together are the actual tools that the crewmen might use to make the valve connection between the two tanks. We have done some work on that.

RECER Okay. After today's EVA do you, and the other folks who are very intimately involved now feel confident in this suit, in its use for the MMU?

FISHER Yes I do, I think as in any system there are probably a few little glitches that'll come up and maybe cause minor problems, but we would expect that in the Orbiter or any other system that complicated, but I was confident in the suits

before the 5th Shuttle mission and the problems we found needed fixing, and I think it's unusual that they both occurred at the same time like that, but now that we have taken care of those problems and had a successful EVA, I think we can go ahead and make plans for the EVAs on STS-11 and 13 with confidence.

PAO Okay let's go to KSC for questions now.

KSC's questions are from the indefaically Dave Dooling. (Laughter)

DOOLING HUNTSVILLE TIMES Okay, Bill Fisher might want to tackle these. First off, do you have any peek and average heartrates from Musgrave and Peterson during the EVA?

FISHER I wasn't monitoring those Dave, the Flight Surgeon's console would be the folks to ask about that, I was with the CAPCOM and although I have a medical background I don't have any affiliation with Flight Surgeons here, so I just haven't had a chance to look at that.

DOOLING Okay, do we have a official or semiofficial open and close times for the hatch? Going out that is.

FISHER Well I don't have them tied down all that closely, I've got it, I just didn't bring it with me. It was, prebreathe was complete at an MET of 2 hours and 23 minutes so it was about 15 or 20 minutes after that, that the hatch was opened, that was outside of station contact and Dave if you've got the CAP with you, which I didn't bring one with me, I would say that they were back in maybe 15 minutes, 17 minutes after the published time in the timeline.

PAO And Dave I may be wrong on that but I think it was probably mentioned over the commentary line the time it was taking place should be in the transcript.

DOOLING Okay, we don't have an entire transcript here, one is still missing. Did they give you an indication of the percentage of what consumables were used on the suits?

FISHER We don't have any final indication but judging by the use rates on the status checks that we've got about halfway through the EVA, I would say they used slightly less of all of their consumables then we'd anticipated, but again a final status check after they got back in the airlock is what we'd need, and I sure they did one, we just didn't have ground contact with them at that time.

DOOLING Then what you're saying is that at the halfway point that they had only used roughly, or slightly less than half the consumables alotted to them for the whole EVA?

FISHER No, at the halfway point they had, we know where they should be for sort of an average man, we allow that the normal EVA suit will run you 6-1/2 hours without going into your emergency supplies, and we expected them to be at a certain point, but looking at the actual numbers we found that they were doing better and using less of their oxygen, electricity, and cooling than we'd anticipated.

DOOLING Okay, when they were in the aft payload bay working with the IUS tilt table, what apparently was the problem that Musgrave was having with the lock and tackle back there? Did he just have too much tension on the line for, to release, or was there a genuine mechanical problem there?

FISHER I believe there was a genuine mechanical problem with the wench with exists on the aft bulkhead. He, that thing should be able to take hundreds of pounds of tension and still release the slack on the rope when you turn the lever to the correct position. It didn't seem to do that. Story was able to pull the rope off the roller that we had it strung around which gave him enough slack to take the tension off the wench and then it performed normally. But, I think it's a problem with the wench, it's the kind of thing we did the EVA for, we wanted to find out what these, what these little things are that we haven't been able to troubleshoot correctly on the ground. We'll fix it for seven and I think that will be the end of it.

DOOLING Okay and later on, did I understand correctly, that at least briefly he had trouble staying in the EMU foot restraint?

FISHER No, I didn't get that understanding at all. There was, we had some spotty transmissions through that part of the EVA but I didn't hear that. We'll have to talk to him more when (garble) debrief.

DOOLING Okay and...

FISHER Excuse me, I think...

DOOLING One thing, was the entire EVA videotaped onboard?

FISHER Let me just go back to your earlier question a second, I think what you may have heard is in part of the EVA, Story was going to evaluate using the wench on the forward bulkhead in two positions, two modes, both in the foot restraints and out of the foot restraints to see if we really need them. And I think what he was saying was, I'm now doing this task in the foot restraints, and now I'm doing them out of the foot restraints, but that was part of the published EVA timeline, one of the detailed test objectives we wanted to perform. And no, I don't think the whole EVA was videotaped. Certainly more was

videotaped than we saw in our television transmissions, but exactly how much of that 3 and a half or 4 hours, we'll just have to see later on.

PAO That's all from Kennedy.

PAO Okay, I understand we have one question from Dryden.

FISHER We touched on this a bit earlier, after the suit failures during the last mission, are you satisfied with the performance of the suits and can you elaborate on how they did perform in general this time around?

FISHER Yes. They did very well. The only minor problem we seemed to have had, and it was a nothing really, is it seemed like the sensor gave us a little spike on Peterson's suit which gave him a single message, which said your oxygen use is high. That message never repeated itself and we were able to clearly tell from the amount of oxygen he actually had in his, in his spacesuit that his oxygen use was not high. And it's hard to say exactly what caused that little sensor to cause the message, but we'll fix it for the next mission. Outside of that, we can't find a single evidence of anything but ideal optimal type of spacesuit performance. The fans that caused our problems before worked perfectly, and the pressure regulators kept the suits at 4.3 psi just as solid as a rock. We never had any deviation from that pressure.

PAO Okay, we'll come back to JSC for a few wrap-up questions here, Craig Covault.

CRAIG COVAULT Harold, it looks like you did a maneuver there that perhaps you weren't planning to do, and could you explain what you went out of and in to?

DRAUGHON Yes, there was something we had discussed with the crew and we had planned to do it, we just had not, in the documentation that we changed the plans late enough that we didn't get to put it into the books. The nominal attitude for the entire EVA had first been set up for 4 -ZLV, which is payload bay door down which means you go around the Earth and at all times the Earth is under you, or everything you can see is the Earth either illuminated or darkness but its always the Earth. The crew wanted to get sometime during the EVA when they had a starfield above them during the EVA, it's an easy thing to do, to just pick a time and go to an inertial attitude hold and hold that for one rev and you'll sweep out an arc...

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DRAUGHON ...that gives you the (garble) part of the time and then a star field on the other side. We initiated that maneuver at the sub(-garbled) at high noon and went through that, got them a darkness pass with the stars above them and took no sun in the bay, which, that's not a big deal. We could have taken a rev with the sun in the bay, if we had chosen to do that. The ASC, that hardware left there from the IUS launch, has some out-of-attitude constraints, and some heater constraints, and thermal constraints associated with them. So we only did it for one rev and that was indeed all the crew had asked for, so it was, that's all it was. There was no big move to do it, but there was no good reason not to do it, so we did.

I'm curious why they wanted a star field for part of the EVA.

DRAUGHON It was just another attitude, rather than spend the entire 3-1/2 hours in the same attitude. Nothing anything more subtle than that.

On the night side, did they shut down the lights in the bay at all, and just go with the helmet lights for a few minutes.

DRAUGHON There were various times during the EVA, when the plan was to cut down the lights and evaluate the helmet lights, there was no time when you were required the use of the lights to accomplish what you were doing. As a matter of fact, there were times when we had to purposefully shut off lights in order to fully evaluate those. I strongly suspect that some of those were during night-side passes.

PAO Okay, Jules.

BERGMAN Jules Bergman, ABC News, Harold. What is I hope, the final question on this subject. Has the missing lithium-bromide battery been found?

DRAUGHON No, we haven't seen that guy. There were supposed to be 12, and I'm sure at one time there were. We only come up with 11 of them to date.

BERGMAN That still gives you 7 spares, right?

DRAUGHON We had 4 broken, or 4 that were'nt charged, or had lost the charge.

BERGMAN 3 spares.

DRAUGHON So, and at the worst, if you want to (garble) a contingency EVA, the ones that we had in there, even if we'd have used them for the entire EVA, they're supposed to be good for

better than 6 hours. So they could be used again. But the ones we've got onboard...

BERGMAN Were they used today though?

DRAUGHON Yes, they weren't used continuously, but we do know that we heard Bo Bobko mentioning to the crew that they could turn off the right light or the left light so they were probably used intermittently.

BERGMAN I couldn't tell off the bright monitors in our studio, but were you people in the control center able to see perceptible improvement in specific area lighting?

DRAUGHON No we never got that kind of, we couldn't tell either. I think Bobko could only, Peterson looked back at Bo once, and Bo told him, I forget whether it was his left or his right, but one of his lights was still on and the only reason he could tell was he was looking straight at it.

FISHER One thing worth mentioning about the lights, is when you've got them on, it really only illuminates a cone. About 2 feet in front of you, about 12 inches wide. They're really for close-up work, and the only person who will be able to evaluate them is the crewmen themselves.

PAO Okay, John Kerry, back here.

KERRY I wasn't able to tell if they actually took individual tools out of that cargo stowage bay and put them on tethers. Did they do that, and if so, what tools did they take out?

FISHER Well, part of the EVA called for an evaluation of just that subject, and after Story did his suit mobility evaluation, if he followed the timeline, he, followed by Don, would actually take specific tools out of the cargo bay. They're in what are called tool caddies, 2 tools to the caddy, and they would place these caddies in the mini-work station of the spacesuit and evaluate how they would be used. We never saw any of this, we do know that Story had to take specific tools out to complete the planned simulation of the IUS contingency task. Certain ratchets and some of the snatch blocks. Those seemed to go well, because he had the tasks set up as he was trained to have it set up. But that again, that is one of those things that's going to be part of the debriefing, everybody associated with the EVA world is very much looking forward to hearing that debriefing.

PAO Okay, if we have no further questions, we'll go ahead and call this one to a close. Louis, did you have one? Okay, fine. Okay, thank you.

END OF TAPE

PAO Okay. Change-of-Shift Briefing with offgoing Flight Director Gary Coen. That's spelled C O E N not C O H E N as I saw it someplace yesterday. Gary, why don't you run over the log of stowage day.

GARY COEN All right. Well today was, of course, the pre-entry day. There was a lot of work of stowing the various things in the vehicle I'm sure you got to see on TV in fact how tightly things are packed. I think as far as the work that went on today, think one of the most important things that we worked on was that we got some information that had to do with the bracket that broke on the closed circuit TV monitors. The TV monitors are mounted on the flight deck, aft of the flight deck in, on the bulkhead. The history behind that is that when the crew noticed that that bracket was broken they told us 'by the way during the launch phase we heard kind of a popping noise behind us' and they were kind of putting two and two together and had concluded that yes indeed that popping noise was most likely the bracket coming loose from the bulkhead. The bracket itself is bonded onto the bulkhead by some means. I think bonding means that it's glued or epoxied or something. There are really two brackets on there. The other bracket has four bolts on it. The combined TV monitors weigh about 40 pounds. What we want to do is to be sure that we've got the CCTV secured such that during entry when there are g-forces on the vehicle that it doesn't move around inside the vehicle. Like I say, it weighs 40 pounds but the estimates are that it could bend the bracket that it's on now and come loose. So we worked today to get some more information on this, on that problem. It turned out that we were able to get some downlink TV. Don't know if you all were around or were able to monitor but PJ was able to stick his pencil up behind the bracket and move the bracket for us and show us which one was broken and what not or which one had debonded. So we've got some folks right now in the 1-g trainer to figure out a good, good way to secure that for entry. Did a weather review earlier this morning and had a weather update this afternoon. It looks like the weather's going to be in good shape for a landing tomorrow at Edwards Airforce Base. I can give you the individual parameters in a minute. The jet L2D that I had reported, I guess I haven't been here for a couple days, I reported 2 days ago has leaked again. It successfully passed the hot fire that we had planned to do and it was used subsequently and it started leaking fuel again. Right now that leak has stopped. We haven't taken any particular action to secure it other than we're not using the jet right now. It appears that I think in a, the prognosis for that is that we probably won't use that jet for entry. Down firing jet - there are 2 others on that side of the vehicle to control pitch and roll and the jet is really only active for the very first part of entry up to a q-bar of about 20 which is up high in the

landing phase. There is some reconfiguration that we will be doing to the vehicle computers tomorrow to pre-configure the control systems for that problem. We found another very small leak. It's about half the specification value and if you want it has a very small GN2 leak downstream of the tank iso-valve in the water spray boiler system. Right now that leak is isolated because there are isolation valves that are used to, when the water spray boiler is not in use to keep the system unpressurized. Of course when we do use the water spray boiler, in other words run the APU, that will, that leaking volume or that suspect volume will be pressurized and we'll probably lose a little GN2. It's not expected to be a problem. Let me explain what the water boiler does. It cools off the lubrication oil in the APU and it also has a circuit that is intended to cool hydraulics fluid although that circuit is really not needed. It was thought to be required early in the design of the APU and it's really a function that we can do without. Entry type parameters. Oh, I think I should mention what the configuration is going to be for entry tomorrow on the pneumatics control system. I sure you've read in some of the transcript and heard us talking back and forth with the crew that we've had instances of high flow alarms in both the GN2, extra GN2 usage and occassionally extra O2 usage. Happy to say that that won't affect our configuration for entry tomorrow. The normal configuration is not to have those suspect regulators activated so we won't be doing OPS normal tomorrow in that respect. I think I'll go ahead and talk a little bit about entry. Nominal groundtrack tomorrow will cross the California coast, well now where's my map, will cross the California coast north of Los Angeles and now I've drawn a blank on what the town's name is north of Los Angeles. You can see I'm local. Oh, I can't find it. If I can think about that I'll tell you what town it is. That's the town - Santa Barbara. He'll come just about across Santa Barbara along the California coast and proceed on in to Edwards. The times involved, let me see here if I can find everything. The orbit burn will be done in orbit 80. That's 17:57:13 GMT. LOV for the burn will be 270 feet per second. The crossrange required, in otherwords this is the distance required across groundtrack to get to Edwards, will be 377 miles. I've got entry interface times. If they mean anything to you all you might pick up from me later. The touchdown air speed is 195 knots equivalent. That will translate tomorrow if there are no winds to about 201 knots ground speed. Roll out distance will be approximately 10,000 feet and that's a round number. Let's see we'll be landing at Edwards 22 presuming that the winds are as predicted. By the way the winds are variable at 5 knots so they're small.

PAO How about the auto-land? When do they come off auto-land. That's 5,000 isn't it?

COEN Normally, there are 2 times when they come out of the auto control mode. One is at about mach .9 after they have gone subsonic and they do a handling evaluation and of course they fly the shuttle all the way around the HAC or the heading alignment cone until they get to an altitude of about, the plans are right now, about 12,000 feet. This is, the auto-land interface where the guidance makes its transition and starts using MLS data is at 10,000 feet. So they will fly through this interface and come out of auto at roughly 5,000 feet. The particular feature of going to auto at 12 and coming out at 5 is a crew call. The crew, the CDR may choose at any, at his discretion, not to do that. So it's strictly his call as to whether he does that. I think I'd like to go ahead and take questions now.

PAO Okay, wait for the mike. Over here John Wilford on the aisle.

JOHN WILFORD If we're to believe the Vice President of the United States, Bobko has been sick. If we are to believe the Commander of STS-6, Musgrave has been sick. I'd like some confirmation on that please.

PAO We've heard the same thing you heard and beyond that we have no comment.

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PAO Okay wait for the mike, over here John Wilford on the aisle.

JOHN WILFORD NEW YORK TIMES If we're to believe the Vice President of the United States Bobko has been sick. If we're to believe the commander of STS-6, Musgrave, has been sick I'd like some confirmation on that please?

GARY COEN We heard the same thing you've heard and beyond that we have no comment.

COEN I heard one of the comments and not the other and don't know anything about it.

JOHN WILFORD You don't know anything about it or you don't have any comment.

COEN Don't know anything about it.

JOHN WILFORD If they had been sick would you have known about it?

COEN I won't say.

PAO Only if it affected the mission.

JOHN WILFORD You would have known about it even if it didn't affect the mission.

COEN Not necessarily.

PAO Flight surgeon is not required to advise the flight director unless it does potentially affect the mission.

PAO Okay, Carlos.

CARLOS BYARS HOUSTON CHRONICLE Gary, I'd like to go back over some of the reentry data if you would please. I've got you deorbit burn on orbit 80. I did not it gave us a 1757, is that GMT or what?

COEN Yes it is.

CARLOS BYARS GMT?

COEN Right.

CARLOS BYARS Crossrange 377, TD at 201 knots, ground speed roll 10,000, 22. I've got lost really on where they go come out of

autoland and go back into autoland. Could you express this in perhaps altitude as well as knots? We got altitude one place, knots another and I can't equate the two.

COEN I don't have a correlation with me that would, at 12,000 feet he's planning if he chooses to to go to auto and come out at 5,000 feet. Then further up the profile, let me think about where mach 9 might be mach .9, that's probably about maybe 30,000 feet. That's when he first comes out of the auto mode. Now that's different than the autoland guidance. Actually the autoland guidance interface doesn't start until about 10,000 feet. (laughter).

CARLOS BYARS Hot doggey (laughter) Is that above surface or above sea level?

CARLOS BYARS If he wants to do so he will can run this thing in auto from about 12,000 feet down to 5,000 feet. It's going to be in an automatic mode down to about 30,000 feet and in manual mode down to 12.

COEN That's correct.

CARLOS BYARS Then he's got the option of going back again.

COEN That's right. And the autoland part of the test is the part that goes from 12,000 feet to 5,000.

PAO Where's the mikes? Come up here and get Paul Recer, Associated Press, no, second row back, right there.

PAUL RECER Could you kind of give us a summary from a professional engineering viewpoint as to what this mission has accomplished and what asset has it added to America's aerospace arsenal?

COEN I think the mission, first of all, has accomplished the proof of the pudding so to speak in the second vehicle that was built. I think that is one of the most important things, to us anyway, that this machine that we built acts like it was supposed to act. And we're, of course, continually learning how 099 is acting. I might say that I, from an engineering standpoint, am amazed that we could on a first flight like this have only the few problems we had. But I think to us, to me anyway, that it's kind of a proof flight and we're finding out and proving that it works the way it was built to work. Now the other thing, of course, that it is a really good capability is the demonstration that we can although it almost didn't happen that we can put TDRSS and those type vehicles up toward

synchronous orbit. And I think that's a milestone. I understand that the TDRSS is one of the largest satellites ever put that high into synchronous orbit and I think that is a great capability.

PAUL RECER If I can just get you to elaborate a little bit. Does this kind of emboldening your thinking, expand your horizon of the possible sort of thing since this went so well?

COEN I think it does. (laughter). I sure agree with you. Okay.

PAUL RECER One other question. Can you describe the orbit of this phantom that you are trying with which you are trying to rendezvous?

COEN We've picked various places in orbit and try to get there and we call those things phantom places. I think it's just a bit of slang that we use in the Control Center. We say well we'll go here and do a phantom rendezvous to that spot.

PAUL RECER Okay, where was here today? Can you describe it in some manner? Altitude above the Earth or whatever?.

COEN It's a point in space at a certain time and we try we do our best to get there.

PAUL RECER Okay, just time then, is it.

COEN And a place, a place and a time that the we have a thing called a state vector. A state vector is a description of what the vehicle it's a description of where the vehicle is and how fast it's going. And what the state vector amounts to is three position components and three velocity components and a time. And all those things taken at once describe the trajectory of the vehicle. If you know the right mathematics they tell you where it's going to be pretty soon. So what we basically try to do is achieve a certain state. And we're trying to learn how well we can predict our ability to achieve a certain state.

PAUL RECER For us pedestrian mathematicians can you tell us approximately over what point of the Earth this was?

COEN I can't because I'm pedestrian myself. I can't take these three componets and these other three components and figure them out.

PAO Craig Covault, Aviation Week.

CRAIG COVAULT AVIATION WEEK Thank you, Gary I've got several entry questions. First of all, do you know which direction the first bank command will be left or right?

COEN Well, since it's crossrange to the north I would think it would be left.

CRAIG COVAULT Okay, and do you have there on your sheets the roll reversals, mach numbers for the rolls, that'd be mach.

COEN Through the confusion here. Have to apologize for being so disorganized today. I didn't get to prepare too well. Got altitudes but not. Okay, I've got velocities, you can call it mach. First roll reversal is 15.6, second is 8.1 and the third is 3.7.

CRAIG COVAULT Is there, let's see you got a maneuver that can go between about mach 9 and mach 75. Is there any concern that that roll reversal, that 8.1, would force the flight test maneuver to be cancelled.

COEN Let's see, we had a run of that.

CRAIG COVAULT PTI 11, I think is the one.

COEN No it made it and it happened before the second roll reversal.

CRAIG COVAULT Okay. And then one last thing here. Again, I hate to belabor the auto versus auto guidance on the way down, but talking to the guys in the astronaut office they told me that PJ's looking to fly the whole thing manually once he gets on HAC. Is that how you have been predominantly assuming it?

COEN We've had so many off nominal sims that I, the way we train we put failures in and we work the failures off, of course, during entry. And it's hard to answer that question properly because we rarely see nominals.

CRAIG COVAULT So relative to the manual versus auto tomorrow you'll know after he's done it?

COEN Yes, then, like I say it's his option.

CRAIG COVAULT Okay, thanks.

PAO Back, Rudy Abrahamson, go ahead and take Rudy Abrahamson, LA Times.

RUDY ABRAHAMSON LA TIMES Was there some conversation this morning about lights flickering in the cabin or were they talking about the lighting storms outside?

COEN No, neither one. There's a phenomenon that has to do with closing your eyes and seeing lights. I've heard technical explanation as to what that is but it's some kind of cosmic rays or something, some people say. It's been reported in space before and it's to me a ghost. I don't understand the phenomenon is what I'm saying. Two of the crew members today reported that, I think it was Paul and maybe Story, reported that while they were, at least Paul was saying, while he was waiting to go to sleep last night that he noticed that phenomenon and he was talking to Story about it. And that's what they were telling us about.

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GARY COEN Two of the crewmembers today reported that - - I think it was Paul and maybe Story, reported that while they were, at lest Paul was saying while he was waiting to go to sleep last night that he noticed that phenomenon and he was talking to Story about it and that's what they were telling us about.

PAO David Lee, Discovery Magazine.

DAVID LEE (Discovery Magazine) Back to the phantom rendezvous, how many such points have you picked and have you gotten to all of them successfully?

GARY COEN There have been 5 maneuvers. There must have been 5 points, although I have not followed it - - the overall intent of that, but I do know we've done 5 maneuvers - -

DAVID LEE Did you get where you wanted to be on all 5 occassions?

GARY COEN I think so. Yes.

PAO Okay back here on the aisle.

MIKE WILLIAMSON (KJOJ FM) Concerning the landing, should you be waved off at Edwards, what parameters would change for landing at Kennedy?

GARY COEN Well, if we got waved off at Edwards, if, of course we don't think we will, if we got waved off for Edwards it would depend on, of course, why we got waved off. If we were, say, working some problem that was necessary for entry, we can just delay one orbit and come in again at Edwards. If we were against a weather problem and it was thought or predicted that the weather for tomorrow would be better, we'd wave off a whole day and come into Edwards again tomorrow. So, the particular, I couldn't parameterize what the differences or to KSC other than we sure want to go Northrup, or we sure want to go to Edwards.

MIKE WILLIAMSON Okay. Thank you.

GARY COEN It's the highest priority in our list of - -

DEBORA LYNIAR (Cable News Network) How would you compare Challenger's performance to Columbia's from what you know so far and from what you know, will it be able to make that quick turnaround for another flight in 2 months.

GARY COEN Well, comparing Challenger to Columbia, when I worked on Columbia I was on the propulsion console in the control center. I thought that there was a lot more activity working Columbia, problems if you will, than there are with Challenger. I think in that respect, as far as comparing the vehicles' first

flight, I think Challenger is much cleaner. My own opinion. On the other hand, I think since Columbia was built, the people doing the manufacturing and the people doing the testing have learned a heck of a lot and knew a lot more on how to build the vehicle so I think the experience base that was picked up in Columbia reasonably explains the differences that we're talking about.

PAO Okay. One further, one row further back there.

JOHN BISNEY (RKO) I'm just going to ask you, are they going to do any braking on the landing? You said they have about a 10,000 ft rollout.

GARY COEN Yes. There is a braking test, a detail test objective and the intent is to check the brakes.

PAO Okay. Very back row back there.

JERRY HENNA (Time Magazine) Corollary to his question, what's going to be the landing weight estimated?

GARY COEN I was afraid you'd ask that. Going from memory, it's about 190,000 lbs.

PAO Okay. Move back up this way and catch the guy way over on the side.

MARK SHARTREY (National Space Institute) Has there been any change in the estimated time of touchdown and have you heard anything more about their EVA activities.

GARY COEN Yes. There has been a change and I'm sorry that I didn't report it. It's 10:53 am Pacific, so that changed a little bit. And what was the other question?

MARK SHARTREY Have they given you any more comments about their EVA activities and experiences?

GARY COEN We asked a couple of questions. What we asked was whether they were able to see the edge of the blanket that's up on the oms pod. They said they couldn't elaborate any more on that. They saw it again, of course, on their EVA. Other than that, I can't think of any specific comments from the crew on the EVA. I'm sure they thought it was great.

PAO Craig Covault, Aviation Week.

CRAIG COVAULT (Aviation Week) Another entry question, landing question really. Is it fair to say if the lakebed was not wet, you'd be going for the lakebed and that you're really into your second choice with he concrete (garble)?

GARY COEN That's right Craig.

CRAIG COVAULT And also for a change made I guess about 2 weeks ago. You're coming on a rev earlier or later and the reason is to get an extra rev beyond (garble) rev.

GARY COEN We came - - we decided after we realized that we were going to be launching later in the day that the lighting at Edwards would allow us 3 opportunities on landing day. You know, we slipped the launch by something like 4-1/2 hours or so. When that happened, we realized that that opened up 2 more daylight opportunities at Edwards at the end of the mission. To take advantage, to try to gain the capability to have a one rev go around, in other words, two chances at the end of this flight, we moved the normal entry up by an hour and one half, by one rev. So, the idea there was to, in case we had to hedge our bets, we were maybe running behind the timeline or had some failure or something we had to cope with that we'd have a backup opportunity and wouldn't have to sit there for a day - - so we figured we needed that opportunity and that's why we moved it up.

PAO Paul Recer, Associated Press.

PAUL RECER How about the old problem of cross wind landing. Is that going to, is nature going to provide you a cross wind tomorrow, or - -

GARY COEN It doesn't look that way from the forecast we have. It's 5 knots in the variable direction, so it doesn't look like we're going to get a cross wind.

PAUL RECER Okay. Is that going to present you with any problem going into the Cape without that experience behind you?

GARY COEN We're going to carry some what I think are reasonably tight cross wind restrictions for that first KSC landing. We think we'll be conservative. So, we're not really going to challenge the envelopes that maybe we could have if we would have had the experience at a lakebed earlier.

PAUL RECER Can you express those constraints in numbers for us in the Cape cross winds?

GARY COEN What we're carrying for STS-7, everything is subject to change and review, but what we're carrying right now for the cross wind constraint for 7 is 15 knots.

PAO We'll take one more from Jules Bergman and then we'll go to KSC.

JULES BERGMAN I have a two part question Gary. First, is what I call a hypothetical mythical extrapolation question. Since

Challenger was cleaner than Columbia on its first flight, do you therefore expect Discovery to be cleaner than Challenger on its first flight, especially engines. And after you answer that, I have another question.

GARY COEN I'm not very good at engines. I'm an entry guy right now. I would expect that we have gained a lot from our experience with Challenger on the engines. I think we've learned better how to perform leak checks and we at least now know what to look for. As I understand, the investigation that occurred at the Cape, it was awfully hard to find where the leaks were and it was, took some time to figure out an instrumentation system to go off and do that. We've now got a method and we know better what to look for so in that respect, I would expect that the next inline vehicle will certainly benefit. Now who knows, it's kind of a development program and there may be some other move that we learn about, but gee, we ought to know a lot more about leaks now than we did in the past.

JULES BERGMAN Second question. Are you familiar with the National Academy of Engineering Report recommending beefing up the landing, the nosegear, saying that it will wear down too soon?

GARY COEN No.

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BERGMAN ...Second question. Are you familiar with the National Academy Engineering Report recommending beefing up the landing, the nose gear. Saying that it will wear down too soon?

COEN No.

BERGMAN Since you're an entry guy I thought I'd ask you that. But my real question was, since you say you're not familiar with that, you say there will be a braking test between 10,000 and 5,000 feet, or what?

COEN No, the braking test is based on speed. The crew will at about 140 knots ground speed they'll put the brakes on full for about 6 seconds. And those are all rough things. You know, he might put it on at 138 and 4 seconds but that's the planned test is about 140 knots he puts the brakes on full for about 6 seconds. Then he brakes below that to about 8 feet per second squared in deceleration. That's the planned test.

BERGMAN Translated what is 8 feet per second squared? Miles per hour?

COEN That's the deceleration, well that's really your regular change in velocity that's like a, you can equate feet per second squared to g's if you will.

BERGMAN No, but not according...

COEN If he...

BERGMAN If he applies full brakes at 140 knots for 6 seconds, what is the resultant loss in speed? After 6 seconds, what is his velocity likely to be with a 190,000 pound vehicle? 110? 90? You must have some idea.

COEN I've got an idea but I don't think I have a good one Jules.

BERGMAN Well, tell us. You're not being held to it.

COEN Oh, I guess maybe 80 knots.

BERGMAN Okay. Now, you say he then tries it again?

COEN No. At about 6 seconds, or my rough estimate 80 knots, he backs off the brakes to a level of about 8 feet per second squared. He has an indicator there in the cockpit that tells him the deceleration that he's applying to the vehicle. So he brakes hard, peddles to the middle to about 80 knots and then backs off to 8 feet per second squared.

PAO Let's go to KSC now for questions.

DAVE DOOLING (Huntsville Times) What kind of figures do you have in terms of how the consummables have been used. Are you right where you expected to be? Is he using any more or any less than anticipated. And on the leak that we were told about prelaunch on the hydraulic accumulator, has that continued back there but still down at a low level?

COEN Okay. Let me start with the consummables. We have enough extra, we feel we have enough extra RCS and OMS propellants that we could add some detailed test objectives and in fact we did so to today's flight plan. That extra test objective took or was estimated to have taken about 80 pounds. In fact I believe that test objective is being accomplished now. They were about ready to start it when I left the Control Center. This was an added deadband test to see how much propellant we would use in a certain mode. It's called an aft jet only control mode where we control attitude for a while with only the aft jets and turn the forward jets off. Most all of the consummables are in real good shape. The reason I mentioned that one was we had an excess to the degree that we thought that we could do another test objective. Hydrogen, which is the consummable that is usually the limiting one in terms of fuel cell usage, indicates that we can go past the normal entry planned for Saturday by 4 additional days in orbit. Two of those days would be at a normal power level and the other 2 days we'd have to power down a little bit to make the 4 days. So should something occur that makes us want to stay up there an extra time we have the consummables. I'm only giving you those numbers to demonstrate that we have a PAD over the consummables right now.

PAO Anymore questions to ask?

DOOLING Yes, the hydraulic leak, rather the leak of the hydraulic accumulator.

COEN Oh, I'm sorry.

DOOLING And also, an additional objective that was added a day or two ago was to do a second vacuum and (garble) of the main propulsion system. Was that accomplished?

COEN Okay the vacuum and (garble) on the main propulsion system was accomplished so we've done 2 now and we're satisfied that we have all the gases well out of there. And I keep forgetting your other question. Hydraulic leak

DOOLING The hydraulic accumulator leak.

COEN Okay. That particular, that particular signature has been masked because of onorbit cooling and thermal activities. We think it's probably still there but it was pretty small to begin with and takes a long time to measure and some of the temperatures and pressures have changed and we can't prove that it's there anymore. Again, we can't prove it's not there. It's awful little. And, okay I guess I answered the question about vacuuming earlier.

JOHN PINE (Reuters News Agency) I guess this is an entry-type question. How many U. S. Flags are stuffed in those lockers when they touch down on tomorrow morning?

COEN I don't know John. I guess I can estimate like I did for Jules. It's 80. (Laughter).

TOM BOYLES (Tipson Conservative) Do you have the coordinates for the deorbit burn?

COEN In lat long? I may. I have so much stuff here. No, I'm sorry I don't. Don't have it.

PAO Okay. Understand Dryden has one question.

BOB FUSS (UPI Radio Network) Could you tell me first of all if you have a time for when Challenger will cross the coast and secondly, how firm is this 10:53 landing time. For instance the OMS burn scheduled for tomorrow. Could that change it and which way might it change it?

COEN I think it's fairly firm. I think within 3 or 4 minutes it's accurate. And no sir, I don't have a time when they'll cross the coast.

PAO Okay, and no place else has any questions. Okay. Let's come back to Houston then and anyone else here have any questions? Jules. Okay. Take Carlos here and then we'll go back to Jules.

CARLOS BYARS Okay. I've got one. I'm not sure that this falls into the prescribed area of crew health or not. But the reason for the pre-breathe of course was to get the nitrogen out of their system so they wouldn't have bubbles forming in joints. Has there been any indication that you all can discuss pro or con of this matter?

COEN Not to my knowledge

BYARS Another deorbit type of question. I don't need a lat/long for my readers. Would, is over the Indian Ocean close enough?

PAO Yea, that's about standard to get into engines.

BYARS Thank you.

PAO 180 degrees travel on the way up. Jules Bergman.

BERGMAN Mine was pretty much the same question, Terry. I was going to ask if Gary or someone else from Mission Control could get the logistics of lat/long entry speeds, that kind of thing, to you.

PAO Yea, we'll be getting later numbers as the evening wears on and tomorrow morning of course we'll be getting the numbers that are a little bit later than the ones we have here now. They shouldn't change all that much. But, yea, the maneuver table will have the lat/long of deorbit burn and so on and guys that are on the PAO console now and on the next shift will be required to copy and send them over to the query desk. We've been doing that for a couple days now for all the number freaks. Any other? Back in the back row here.

MIKE MEECHO (Ganette) Why, what's the extra 4 minutes for in your touch down? Is there some particular reason why we're a little bit later?

COEN The only explanation I have for it is that the orbit that was given to you for the original prediction didn't match the one that we're computing right now. What determines that is really the altitude that the vehicle is in. That determines period of the orbit. The lower the altitude the faster period, the faster the vehicle goes around the earth. Of course the earth turns so that time gets changed depending on differences in altitude. So if you end up in an altitude that you earlier computed you could end up with different numbers.

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MEECHO What's the extra 4 minutes for on your touchdown? Is there some particular reason why they're a little bit later?

GARY COEN The only explanation I have for you is that the orbit that was given to you for the original prediction didn't match the one that we're computing right now. What determines that is really the altitude that the vehicle's in and that determines the period of the orbit, the lower the altitude, the faster period, the faster the vehicle goes around the Earth. Of course, the Earth turns so that time gets changed depending on differences in altitudes, so if you end up in an altitude that you earlier computed, you could end up with different numbers.

MEECHO It's not because the ship itself has changed orbits from where you expected - - that is altitude from where you had expected it to be?

GARY COEN No. Just slight differences in the profile that we flew versus the profile that we predicted the first time on.

PAO Anyone else. Okay. Thank you very much.

END OF TAPE

STS-6 POST-LANDING PRESS CONFERENCE 4/9/83 AT DRYDEN FRC /1

PAO Good afternoon ladies and gentlemen. This is the STS-6 Post Landing Press Conference from NASA Dryden Flight Research Facility. Before we begin I have a few anouncements. First, the STS-6 Orbiter Status Press Conference is scheduled for 11:00 am Pacific Standard Time tomorrow, Sunday April 10th. Another, an estimated 100,000 visitors have gathered here today to view the landing of the Challenger and our STS-6 crew. Following today's press conference, the flight crew will be welcomed in a ceremony at the Dryden Flight Research Facility. Attending the ceremony will be the STS-6 crew who will make a few remarks as will NASA Administrator, James M. Beggs, California Governor, George Dukemagien, and the Air Force Flight Test Center, Major General Peter W. Augers. With us today for the STS-6 Post Landing Press Conference is Lt. General James A. Abrahamson, NASA Associate Administrator for Space Flight, and Mr. Ed Smylie, Associate Administrator for Space Tracking and Data Systems. After their opening remarks and before we begin Q & A, please remember to wait for the microphone then identify yourself and your affiliation. Questions will be taken, taken from all participating Centers on the loop. As we have a fairly limited time period for the Conference, I ask you to please try to limit your questions to those areas that are germane to a post landing press conference. General.

GENERAL JAMES ABRAHAMSON Well how was that for a mission? (Applause). Well, let's see. The crew was out at 11:24. They're in great shape. They've been in great shape for months actually and really did a superb job on the mission. The mission clearly was, with one exception, and the drama we'll leave to Mr. Smylie to talk about - the drama deparment here, with the exception of the problem areas that we had during the deployment of the IUS and the separation of the TDRSS satellite, the Mission was just incredibly routine. And it really meant that the Challenger is just a superb spacecraft. Let me give you just a couple of numbers to give you a feel for what this is like. On STS-1, first of all we keep a track of anomalies. It's just like a maintenance record that some of you keep on your automobiles. Some maybe like me don't do it too well. But, these anomalies we pile up during the missions and of course go to work on them well before the mission is complete. On STS-1, remember this is a long time ago now, but this is the first flight of the Columbia and it was only a 2 day flight and there were 82 anomalies of the system. Now that's not just the Columbia itself but the whole system itself. Each flight got better down to the last flight of the Columbia it was all the way down to 27. And I think I've said in the past, that we really like used spacecraft. Well, of course, you know we had a rather delayed period on our new spacecraft and we didn't really like the new engines or the, or the fact that we had to have a period in which we had, we shook this one out. But we ended up the flight as of just prior to reentry with only 22 anomalies which meant that we're just continuing down this learning curve in just a really great

shape. So I'm delighted. Now you all know that, and you can probably see on the TV, that we have some areas where we have lost some blankets on the oms pod. Those are advanced thermal protection system blankets. Actually we have 3. One that was kind of ripped off in the front part of the pod and then 2 on each side that are kind of bent and damaged and flap just a little bit. We don't think that there was any thermal problem at all. Underneath that we have our TV and if you could see on the TV it looked good and red so there was nothing really burnt at all associated with that. On the starboard side we had an equivalent sort of a problem and there are 3 small pieces that are missing. We're getting rather, I won't say blahsey, but we are, we are, we know that that sort of thing happens and we'll resolve that very easily. So, I guess the key point. One other indicator of just how routine the mission was and this is, and it is a good strong indicator. It's one that is of great interest to all of the crews that work around the clock at Johnson, is that we did not have to do any significant replanning of the, of the mission itself. On all of our past missions we have had some adjustment that we would make here and there in the timeline and change some of the things and that meant that a gound crew was working overnight to change the sequence or to send up new checklists for the flight crew and it meant changes. This time it was flown exactly as planned including a marvelous EVA. So we're just delighted with the entire mission. And of course we're also very pleased that we're at a situation now where it clearly looks as we can recover the spacecraft and that really was a drama period and it was people that allowed us to recover from some bad that things that happened to us and some good things that happened to us. And notice I don't say luck here. Some of the bad things happened, we have an investigation team that's already met, is already going after those things and will resolve those, the things on the IUS. The good things that happened are a result of the teams being ready, having been well trained and able to work together and this is a far flung team that worked across the country and Ed is going to talk to you about just what that was like. Ed, maybe you'd like to summarize that a little bit.

ED SMYLIE Okay. Would that my part of this could be as routine as your part Abe. I'd like to say a few things before I get to that. In particular as the customer to the STS system for this mission, express my admiration and appreciation to Abe and the crew and all of the people in the, in the Manned Space Flight organization that took us to the point of deployment so flawlessly. It was really another step toward showing that the Challenger and the Columbia and the whole STS fleet is really, truly moving towards being operational system. I think another step towards operations and something that I am particularly interested in because I worked in it for 10 years in Houston in the Apollo program is the EVA. EVA offers great promise and I'm glad to see the STS Program back in business in EVA and that group down at Houston and Story and Don really doing such a great job. And that's going to really be good for the program over the

both the near term and the long term. We had a problem after deployment from the, from the Challenger on the second burn of the IUS. There was some kind of an anomaly as General Abrahamson has said. There is an investigation team in place and working to resolve that. We're confident that that will be done and we'll get back on track there also. I guess I went from, from great expectations to the deepest despair back to semi-elation and now back to a point of hard, considered work as to what we do from here on out to get this spacecraft where we want it and operating the way that we know that we can. But I would like to note that I was in the, I was in the room in Houston when we were trying to, we were'nt trying to we were coordinating all of the activities between ourselves, our contractors, Spacecom and TRW, the Air Force, the Boeing people and all of the other contractors and people around the country that were involved in the coordination of the activity to carry out that deployment sequence through the 2 burns of the IUS. And it worked very well. The decisions were made in realtime and I think the right decisions were made in realtime between that group of people all around the country. It wasn't just in that room. It was everywhere and over a period of about 3 hours things happened in a way that we were able to get the 2 spacecraft, the spacecraft separated from the IUS, get the spacecraft under control and move on towards what we need to do to get it to operational. Once we got the spacecraft in an inertial mode and stabilized, the team in place to do that, our contractors, industry teams, Spacecom and TRW and the engineers from the Goddard Space Flight Center - have been working constantly since that time to be sure that we understand exactly the situation that we're in and move towards a series of thruster burns over a period of about 2 weeks to impart about a thousand foot per second additional velocity to the spacecraft at apogee over a period of about 2 weeks at which time we believe that we will be, are confident that we will be at the geosynchronous altitude that we require to operate the system the way that we want to and at 74 degrees longitude. We will take our time in doing that. We haven't decided at this point when we will initiate that activity. We don't need to hurry. We've got the spacecraft in a very safe condition. The orbit is a good orbit. It will stay in that one as long as we need to to make the decision to proceed with the burns. We're using little or no fuel to hold the orbit that we're in. Our attitude is good and we have plenty of time to analyze the situation and decide what to do next and when to do it. But we do know that we have enough fuel and we have the capability to get there and we'll be initiating that sometime whenever our teams have all analyzed it and have decided that we're ready to go. And again, congratulations to the STS team and thanks Abe for a good ride. (Applause).

PAO All right now. If you have questions please wait for the microphone and identify yourself and your affiliation please.

LYNN SHERR (ABC News) Abe, first question is how long do you

think the repair of the blanket insulation will take. What will it add to the turnaround time and the second part, it may be glasses time again, but could you give us the schedule for the next mission please?

ABRAHAMSON (Laughter). I understand that you want to make reservations at the Cape right? Actually, the repair of the blankets. I was looking at the 103 vehicle last night down at Downey or, I'm sorry, at Palmdale here and we're putting on those blankets. We can put on maybe 10 or 12 a day very easily so it just won't add any turnaround time at all. We'll probably take our time about it though because we'd like to understand just exactly why it is that it came off but it won't add any time and then it's a matter of just a day or two. Okay. Next launch. We're planning an early June, as I mentioned, and we're not picking an absolute date at this point in time because we would like to see just how quickly we can turnaround the spacecraft here and get it back to Kennedy and we're just tentatively about the second week in June at this point. Pardon me.

SHERR How about 8?

ABRAHAMSON 8. We're tentatively about the first week in August.

PAO Gentlemen over there please.

GARY KAUL (KTU Oakland) The satellite correction program, what kind of orbit do you hope to put it in? Will it be the orbit that was planned for it when your finished?

SMYLIE Yes sir, we expect to have it in geosynchronous orbit, our location that we desire is 74 degrees to continue our checkout, actually we have initiated our checkout now. We plan to go to geosynchronous.

LEE DUMBART (L.A. Times) Abe, what about Spacelab? Will the TDRSS problems effect that at all now?

ABRAHAMSON Well, we do have some relay tests decisions to make as we go through the summer, of course. The investigation effort which is just an accelerated investigation effort by joint team by NASA and the Air Force on the IUS, will determine whether or not we can quickly find out, number one, what the problem was and develop a fix that we can have confidence in, until we do that, we won't commit another IUS with another TDRSS so that gate we have to get through prior to the time we launch the second TDRSS Spacecraft. Now, just in case something goes wrong with that and we can't make that by that first week in August time frame, we are working on a backup plan and that backup plan is to use a single TDRSS to support the Spacelab mission. And that's looking favorable, however, we have several things we have to go through with that as well. We have a great number of scientific customers on the Spacelab, as well as the Europeon Space Agency,

so, once we get this plan fully laid out, and determined whether or not we indeed need a sufficient number of the science objectives, so that they will determine tha from a science point of view as well as a Spacelab checkout point of view that that's a satisfactory mission, well then we'll go ahead. Now, from the Space Shuttle viewpoint, we can maintain that 30 September launch, that's not a problem the real question is will we be able to get the science return that we're after. And as I say that's more favorable now, as we're going through that backup plan even with a single TDRSS. But, that final decision won't be made for about a month.

PERNELL CHAPMAN (KMBC Los Angeles) What about future shuttle landings, will they continue here at Edwards? Will they moved to Florida, or elsewhere?

ABRAHAMSON Our next landing, God willing that we have some nice weather in Florida, we're planning at the Cape. Now, there will be some limits and we have to have something that we can accept, we don't want a crosswind more than around 10 to 15 knots, and that final decision has yet to be made. And in the June time frame we don't think that'll be a problem. However, we are concerned about the weather at that point. There are quite a few thunderstorms at the Cape, and we have to be able to predict a full 3 hours or so prior to the landing. So, we'll look very carefully at what the local weather looks like primarily from a thunderstorm viewpoint, we don't want to land through any thunderstorms. But the plan is to go to the Cape.

CHAPMAN Routinely, that is, Edwards will no longer be the primary landing site?

ABRAHAMSON No, we'll alternate back and forth. The eighth flight, providing we do go ahead as scheduled, will be a night landing. And the first time we do this at night, we'd like to have all the room that's around here, and provided the Lake finally becomes a dry Lake again like it ought to be, well then we'll come back here on the eighth flight. So it will alternate back and forth depending on some of our objectives and some of our limits for a period of time. But, our objective is to get routinely to the Cape as quickly as possible.

JOHN BROOKS (KFWB) Can you tell us now, how many, if any of the astronauts experienced any significant space sickness?

ABRAHAMSON No, that's not our plan. The way we were approaching this from a policy viewpoint is, and there's a good reason for this, and I'd like to give you just a little bit of the background. We determined that in fact, we were violating a freedom of act information for the astronauts and by the way, the astronauts kinda fall in two categories, one category they're just not worried about it at all and they don't care about whether or not if they don't feel well, talking about it, that's probably the category of some of our presidents who don't mind

showing their scars on TV or something like that. There is another group, just like some of you I'm sure, who would like to keep that to themselves and keep that between their doctor and themselves, so that's the basis for the policy and that's why what we've really done is we've shifted the responsibility to the flight crew. Now, we do feel however, that there is an obligation in keeping with NASA's long term tradition here of if there is any real mission impact, any real possibility of a mission impact, that we'll tell that to you. And that's inferred in the policy itself. So, if for example because someone were ill, we were going to have to change the timeline in a significant way, or perhaps one of our objectives were questionable, well than we'll summarize that. And let you know why it is. But, we think that that's a good balance between maintaining their privacy and the public's and your right to know. And so, we don't feel that either during a flight or after that we ought to be talking about the individuals that were there or the numbers or whatever, and if you'll notice, there was no mission impact. Absolutely none.

QUERY What will that do to science? In determining the effective safety How will the scientific community get that information?

ABRAHAMSON There will be scientific, you know we're taking data on every flight, because we do want to understand this. Not because we think it's a significant problem and I would hope that you all would understand that and believe it. It's kinda like, and I've said this before, it's a problem like every Navy in the world has had to deal with and has overcome, it hasn't had any significant impact and we don't expect that it will. However, it is important to us that we do get the data and get it very very accurately. And in fact, we were concerned because I think the focus that the press was making on this and making such an unecessary big deal out of it that we weren't going to get the data. So we had to go to a point where the astronauts would know that their rights to privacy would be protected. And then it will go into our scientific data bank. Now, if you and the others who are interested in whether or not this is a serious problem for all of us, there will be periodic scientific reports that in fact outline what's happened in a statistical way, and we think that will indeed protect the rights of the individual. But still, you will be able to see if there is a serious problem. And we don't really believe it's a serious problem. Sorry, that's a long answer but I know it's a sore point frankly, it's one we're not very comfortable with, but I think it's the right balance between the privacy in the individual and what is the responsibility to provide all of you in the country any information, if it indeed is going to have an effect on the program. But just because the guy's got a headache or happen to have a minor vomiting session, we don't think that's neccessarily what everybody needs to deal with.

PAO Frank.

FRANK (Los Angeles Daily News) What about a worst case scenerio for Spacelab if this second TDRSS is not sent up? And this alternate plan doesn't meet your needs for your various customers, would you hold a Spacelab for another flight or what would happen with that?

ABRAHAMSON That's a tough decision we'd have to make. And I couldn't make that alone. I'd have to make it in colabaration with our Europeon partners in the Spacelab program. Their preference at this point provided we can get an acceptable level of science is to hold to that 30 September date. If it's for some reason slipped into the winter period, then the science would be impacted another way. We would not have the right time of the year, and some of the lunar conditions that we want in order, again, to get good science. So, it could be a significance that this happened. We're doing our best to avoid that.

(garble) significance be a year or ..?

ABRAHAMSON Oh, no it wouldn't be a year, but it would be until later in the Spring.

FRANK Alright, a follow up, perhaps to that question. Is the shuttle's credibility of being able to put Satellites into orbit threatened at all by the mishap? By the problems you've had with this?

ABRAHAMSON I don't think so. We've continued to sign up customers by the way throughout the time we were on the ground prior to the flight, and even another one during the flight. So, I don't think so. Now, surely there is, and I don't want to minimize the problem, there is an honest to goodness problem with the IUS, that we have to find and solve. And we'll do that, and we'll find it and we'll solve it.

PAO Okay.

ABRAHAMSON Remember, most of the payloads, particularly the commercial payloads go up on PAM D and PAM D2, an advance version of the PAM. At this point in time, the IUS is only going to put up in the near term some of the very large NASA payloads, those are Ed's the TDRSS satellite. And for the Department of Defense, some of their large security payloads. So outside of that rather limited community the IUS problem should not affect the shuttle's overall system capabilities.

PAO Please remember to identify yourself.

Susan (garble) Question goes to Mr. Smylie. Given the need to use onboard fuel to correct the TDRSS orbit, unless reducing the amount of fuel available for station keeping, by how much will the life time of the Spacecraft be reduced? And question number

2, how will the TDRSS failure specifically effect missions to support?

SMYLIE First, at this point we don't have a TDRSS failure, we have a failure to achieve the proper orbit. We have sort of a serendipitous situation concerning the fuel, that the amount of fuel that we have onboard, 1300 pounds was there primarily for some very precise station keeping required for the commercial service component of the TDRSS program which actually would have been the fourth satellite to be launched. Back in the fall of last year that commercial part of the program was eliminated through mutual agreement between ourselves and the contractor. So, we do not have the requirement for the precise station keeping for the commercial service anymore. And the requirement for the TDRSS service for the NASA payloads is much less. So, for the 10 year period that we would design the satellite, we don't need all that fuel. So serendipitously we have the fuel available to make this orbit correction. On the other side of that coin we could have made a decision to remove that fuel pre-launch and we left it in there. Somewhat for this reason, that you always have the possibility of a short burn on an upper stage, and it's good to have fuel available to make that last correction if you need to. We never expected to make this large a correction. But we do have the fuel, so it will not effect the life of the satellite for it's intended use at this point. As far as future payloads are concerend, when we get the satellite where it belongs, we are in the process of checking it out now, so we are not losing checkout time substantionally. If we're able to launch the second satellite in August there will be no effect on future payloads.

JACK Los Angeles General Abrahamson, what can you tell us about the safing procedures on STS-6 so far, the gas testing the astronaut egress, and what unusual or interesting things might we expect as a result of what you found out so far in the past hour and half?

ABRAHAMSON Actually it's gone very well, I only have a preliminary report. This was as about 11:15, I'm sorry about 11:35. That everything, all of the systems really do look good. Obviously we're curious about those places where the advanced thermal protection blankets, what we call afra, they have come off, the safing procedures do look good. We did have an umbilical that problem that we knew about, because at launch, we discovered that there was the part that separates and stays there with the launcher was bent slightly, so we were looking for this as a problem, and that's the only other anomaly. And it hasn't caused any kind of an issue. By the way our roll out was about 7400 ft which pleases us, and that was with an 18 knot crosswind. That's a little less than last time, which was only about 9500 ft but we used a little more severe braking procedure this time too. Right down the middle of the runway. Good Air Force type landing.

JIM TOWNSEND Mutual Broadcasting Can you tell us how the overall performance of the Challenger compares to that of the Columbia and as a followup, if there is a favorable comparison, can you say that the Shuttle program has truly arrived that you feel cofident, that you can build spacecraft, send them into space, bring them back without any particular problem?

ABRAHAMSON Well I mentioned the number of anomalies. I think that is a very good indicator and indeed the Challenger was a much better spacecraft. It was manufactured more - in a more exacting way and had a higher quality level and that's what one expects with the second vehicle as opposed to the first. So I clearly feel that all the indicators are that it is indeed a better spacecraft. However, I'd like to concentrate on the team. I was asked prior to the liftoff, are we operational? Essentially the same question you had. I believe we will still find as we go downstream some minor hardware problems and probably some software problems. There still is a level of maturity that the system has to achieve and I don't expect any of them will be serious problems because I think that we've gotten most of the significant bugs out of the system. But there will be some. Most important thing and the one that I like to focus on and the one that I think is a real credit to the space shuttle organization is that the team and - is ready to find these problems and in stride solve those problems and make corrections and get the machines back into operation. Now it cost us a little bit this time. It cost us 2 and a half months but that was a price that was worth paying to assure the safety of the astronauts and the crew. Furthermore, it was a price worth paying because we're going to have a better more operational program downstream. And we did develop test and procedures starting way back in the manufacturing process, a little tighter operation there and the engineering process and all the way through our flows down to between flight checks at the cape. So if you measure operational by the people, I think that at least I'm very confident that we can go ahead and in the airplane programs and missile programs I've been associated with in the past that's the best way to measure whether or not you're operational, because there's always a problem you have to solve. In fact if we didn't have any problems to solve, this would be boring business.

HELEN LING (Television News, New Zealand) I have several questions to direct at Abrahamson. When will we see astronauts from other countries other than the United States flying.

ABRAHAMSON On the spacelab flight, which - of course we're hoping to maintain on the thirtieth of September that'll be the first European astronaut. In Australia, down close to your home country, your country is now struggling with how it is that you can best select an astronaut to fly with us. I personally took an invitation to your country and we're delighted too that you're going to go ahead. So when the first Australian payload flies in 1985 we expect to see an Australian payload specialist with

that. And there will be others too as we go ahead. So it's not very far away.

LING ... Discovery and Atlantis, be in flight.

ABRAHAMSON The OV103 our next Discovery Spacecraft is scheduled to come out on September and then we go through an extended checkout period at the Cape just to ensure that it's ready we'll do another flight ready firing as we did this time and we expect the first flight of that will be in the Spring then of 1984. The Atlantis is about a year after that.

DEBRA MANNING (KCRP TV News, Los Angeles) You had a spectacular glamorous flight. The EVA was just spectacular. What are you going to give us for an encore in terms of very specific things in terms of EVA and what have you that the public can look forward to.

PAO Did you plant that question, Abe?

ABRAHAMSON Well, the real objective if the program is not to have a series of circuses, you know that. But we like to do things that are exciting for all of us and that lead to the operational capability of the system. Let me try to put in context what I think is going to be an exciting year. On the next flight, on the seventh, or course we'll put up two communications satellites, but following in the context of the EVA and getting ready to demonstrate our ability to repair satellites, Sally Ride, our first lady astronaut will operate our Canadian arm. What she'll do is she'll take a German payload, now notice that nice international flavor to that. She'll take a German payload, an exciting one called Spaus, and I think I commented on that last time. And she'll put it outboard with the Shuttle and it'll fly and keep formation with the Shuttle and we'll kind of move around and do that. But we'll really test our ability to reach out with this Canadian arm, grapple another satellite, all right, with different rates and small errors associated with it and bring it back and put it in the bay. And we think that's a very important thing to demonstrate. Next, in the eleventh flight, downstream, we'll demonstrate the man maneuvering unit. And at that point, our astronauts will not have to be tied to the tethers but they'll go scooting around outside the - outside the bay in order to demonstrate maneuverability in the fact that we can infact control the space and work in the space around the Shuttle itself. And of course all of this is a step by step process to work up to the thirteenth flight which is scheduled late in the spring of 84 and that's when we'll go out and we'll repair a wounded satellite, the solar max satellite. And I think that's a whole series of things that have got to catch the public imagination. It certainly catches ours, but the important thing is we're approaching it in a step by step conservative fashion to ensure that we'll have the capability to do it and to do it well and that's kind of the sequence as we go through the next year. Now

in addition or course, we're putting up some very exciting payloads and having a series of important and scientific experiments as well. And I don't want to minimize those.

PAO Okay, we'll now go to Johnson Space Center for questions.

JULES BERGMANN ABC Abe, first of all, personal congratulations and then I have a 2 part question. First for you, and then for Ed Smylie. First one for you is, will the investigating board be able to diffinitely find the cause of the IUS failure and if so when? And after you answer that I'll ask Ed Smylie his question.

ABRAHAMSON On behalf of the team I except the congratulation, Jules but that again is the Space Shuttle team that I think needs to be emphasized. It's very hard to predict of course what the board - when the board will be able to come up with data because, of course, one of things that we lost was the telemetry on the IUS but we did get some rather critical items of telemetry that indicated some of the problems that we had prior to the time that the whole anomaly developed. We also got a very exciting picture of the failure itself. We have a very powerful camera that's part of the NORAD net that was in New Mexico and what we've seen, we saw the failure. You can see the plume develop on the IUS and develop for about 3 hundred miles, this large plume stick out behind us and then at the time of the failure you can see that if the plume pushes off in another direction and you can see just exactly the timing and how it went hardover. So that'll be a great help to the investigating board. So I think we have a significant amount of information whether or not we had enough to be able to get right down and find exactly the cause is of course a real challenge. And therefore, I can't predict it Jules.

BERGMANN I gather your doomsdate snerio here is not finding the cause of the STS-6 IUS failure, and not being able to launch the IUS on STS-8 and you're needing one minimum to do the Spacelab with. Is that not correct?

ABRAHAMSON That was the worst case but as that's has indicated we have high confidence we can restore this one so we think that we do have an optional backup and of course I have a team of people now doing backup scheduling in case the IUS and the TDRSS flight aimed at the first week in August had to be delayed so we're looking at how it is that we can - with minimal impact to our other customers have a way in which we can go up a little later.

BERGMANN Okay, now for Ed Smylie. When will you know when the TDRSS burns will be started and how long they will last to restore it to geosync?

SMYLIE Well, on the first question as to when we will start, we won't start until we're ready and we won't be ready till the teams that we have in place at TRW and Goddard have thoroughly analyzed the options for doing this have understood

the strategy for doing it and reviewed it with us and then, not before then, will we start that. That could be sometime within the next week, it might be longer. There is no hurry ... we'll do it when we're ready.

BERGMANN What is your rough guess Ed?

SMYLIE Well, I don't even have a rough guess right now Jules because the people that are working the problem, are in California and in Maryland and in White Sands and I'm going to start talking to them about this on Monday to establish exactly what the sequence will be. You know, if I had my druthers, we'd be doing it sometime next week, but I don't know if it is going to come out that way or not so I won't predict right now because it's got to be reviewed among all those organizations before we proceed. I think we have in place one of the best groups of attitude control and precaution people in the country working this problem and I want to let them do there work and then come talk to us about what they think should be done and when. I've forgotten the second part of your question now, Jules.

BERGMANN I don't think there was a second part there, Ed.

SMYLIE You ask how long the burn would take.

(GARBLE)

SMYLIE The estimates are about 2 hours per day per apogee for about 14 days.

BERGMANN I have a second part now. It wasn't how long the burn would take but how long, how many days it will take to restore it to the proper orbit.

SMYLIE About 2 weeks after we start the burns.

PAO Craig Covault (AV Week)

CRAIG COVAULT (Aviation Week) I've got two questions for Abe. Are there any considerations on your part to really look seriously at placing an EVA on flights 8 or 10 to get more experience on the hardware before committing to manned maneuvering unit ops on 11?

ABRAHAMSON We have looked at that Craig and find that the disadvantages outway the advantages and therefore I just had to say that 11 is the right place to do that. One thing that might change that whole senario would be if for some reason we were not able to proceed with the IUS TDRSS flight on 8. That will provide both an opportunity in additional payload weight and capability to do some additional things on the flight, so those might change then.

COVAULT Well, that really gets into my second question,

Abe. What is your option for flying 8 in the INSAT payload and possiblity an EVA on 8 if you can't get the IUS issue resolved? Would you still look to fly the 8 crew in the INSAT in that August timeframe?

ABRAHAMSON Craig, we're looking at several different alternatives and we just haven't made those decisions yet.

PAO Down front there.

MAZ RIZLEY (Galveston News) Just to a clarification General. Did you say that you lost 3 blankets in all or 3 from each pod?

ABRAHAMSON We lost, well no. There are 3 that are disturbed. One is clearly lost and 2 that are bent and slightly ripped on the left, lets see, on the port side, the left hand side. Notice I am learning a little bit about the Navy. (Laughter). And on the right hand starboard side we lost 3.

PAO Back here please.

PRESS On 9 if for some reason the TDRSS system doesn't work itself out, is there any contingency to reconfigure 9 to do something else with that shuttle opening?

ABRAHAMSON No. At this point, all of our emphasis has been on just seeing if we can in fact maintain that schedule for the Spacelab itself. Now if for some reason we were not able to launch Spacelab on the 9th, or on the September 30th date on that 9th mission, then that opens up a flexible area on which we could do some minor changes for all of the others. But I would remind you that it's not just a matter of changing the Shuttle time. The shuttle is getting to be more and more flexible. We also have to have the payloads ready and there are limits into how much the various customers can either accelerate or except a delay in their payloads. So, so that's clearly a factor as well as the Shuttle scheduling.

PAUL RECER (AP) I have 2 questions. The first for Mr. Smylie. Yesterday we were told that TDRSS was experiencing in NASA's language some roll dynamics anomalies. Does that spacecraft in fact continue to experience these problems?

SMYLIE We did have some roll dynamic concerns especially when we came out of the eclipse period. We instituted last evening a new procedure for going through the eclipse which involved putting pitch and yaw in an inertial mode, keeping the sun sensors on even though there was no sun and keeping the roll on the sun mode and we've now gone through 2 eclipses in that mode with great success. We come out within the deadband when we come back into the sun with no action of the attitude control system at all. So we think that we have that completely under control now and so that is not a, at this point, a significant problem in terms of the operation we're doing now, but it is part

of the analysis of how we go about doing the translation burns or the apogee burns later and that will be part of the analysis that the teams are going through now to see how to deal with that.

RECER And for General Abrahamson. Philosophically, now that you have demonstrated spectacular success of the Challenger does this give you a level of confidence to plan things that before this mission you didn't have the confidence to plan looking down beyond 84? And if so, what are some of those things that you can now realistically expect to accomplish that before this you couldn't?

ABRAHAMSON I Think there's a better way to put that. We have had plans which step up and take on more difficult challenges as we go on through that and what's happening is that with each success that confirms that indeed our plans are good plans. So, what we had happen this particular time hasn't said, "Okay now we have a whole new horizon opened up. I think much better is that we had both some dreamers and planners in the agency and those dreamers and planners are finding that we're moving a little ways away from the dreams into the reality of the planned.

PAO All right. We'll move to Kennedy Space Center for questions now.

REG TURNELL (BBC) For General Abrahamson. Since space sickness is apparently being downgraded in importance, will you still need to send a fifth crewman, a doctor, on the next 2 missions?

ABRAHAMSON Well, it hasn't been downgraded in importance. I think it was only, I think it was a matter of perception particularly in the press as opposed to with us. No, we're very interested in solving the problem for many reasons. One, we don't want to have anybody uncomfortable up there. We want to have them absolutely operating at a hundred percent and feeling good and enjoying the mission as well as, as well as being able to conduct it carefully and well. There's another reason that we want to solve this problem and it relates to an earlier question that I had. Soon, we are going to have people that are going up with much less training and we want to broaden the base of people that go up. We're going to have at some point citizen flights and there's going to be just lots and lots of people that go up and we sure don't want to make them sick. So, can't charge them very much if we do that. So we are vitally interested in solving the problem, but you mustn't confuse the fact that we're interested and that we have doctors onboard and we have a medical protocol of tests that we're moving on with the fact that we feel that it's some kind of a barrier to our being able to operate the space shuttle in a routine, effective way because we just don't feel that way about it. But we still want to solve the problem.

TURNELL And just one more question about STS-7. In view of the success of the EVA and your own expressed wish to press on with this activity, are you likely to introduce an EVA on that

mission.

ABRAHAMSON No, because we have a very full mission associated with the other objectives. And some of those objectives, of course, as I indicated are part of this plan to develop this high confidence that we can indeed make the satellite repair on the 13th mission. So it's important to us to have some stability in our planning and we won't, we will not introduce an additional EVA session on that particular one.

LOIS WAGNER (Spacebook Magazine) Were there any computer problems during entry and, also, this may be a repetition, but what if any damage was done to the tile especially on the right side of the nose and how much braking was done?

ABRAHAMSON The computer problem that we had was prior to entry. And indeed the, one of the, one of the general purpose computers failed to accept several commands starting at 8 o'clock last night. We worked with that during the night and interestingly enough it healed itself during the night and about 3 a.m. we had no more of those problems. We don't particularly like that because that's kind of an unknown. Therefore, during reentry we were ready for that and had a clear protocol set up as to which of the computers, if a problem developed, which of the computers we would switch to and operate on. And we had no more further problems as we went ahead. So that's just one of the things we'll have to go after later on in the flight. I am not aware, or I haven't had an opportunity to see some of the scan TV or pictures on the right hand side of the vehicle so I can't comment on tiles on that particular side of the problem. Now you asked about braking. We had a braking protocol this time that said that after you put the nose down at I think it was 160 knots then PJ Weitz would go to maximum braking condition and carry that down to 80 knots and then he would go and try to maintain about a 6 to 8 feet per second deceleration rate after that. And of course this was a higher deceleration type of braking protocol than we had on the last flight and that' why we have a shorter ground run of about 7400 feet. And from all indications, he did that particulary well. Now he had an aid to help do that. Remember this time we had a heads up display and what that is is a glass that allows PJ to look out the window but have the information right in front of him and he's able to look out through it. And he was able to have a very easily followed display of his deceleration curve as he went ahead and so I'm sure that made it easier for him to conduct that braking protocol.

PAO Okay. We'll now move to Marshall. We'll have a follow up question at KSC and then move to Marshall.

WAGNER What is the expected return date to KSC for the orbiter?

ABRAHAMSON I should know that. I believe we're talking about,

about approximately 6 days but I'm sorry. I have to go look at that again.

PAO Okay. We'll now move to Marshall.

TOM NITE (WAFF TV, Huntsville) General, the ground crew, have they had the opportunity to examine the engines and see what their condition looks like at this time?

ABRAHAMSON The first job of the crew is to, of course, go and make sure that we don't have any hazardous fluids that are leaking or gases that are leaking and outside of that kind of an examination in the back end and then, of course, just to look to see if there's any obvious external damage then that's all we really do at this point. And I have not heard from them any obvious external damage and we did not have any, any leaks that our various sniffers out there determined were hazardous.

NITE Thank you. My second question. Has there been, from what you've been able to determine from the insulation blankets, does it appear there might be a need for a change in the type of design or the actual application of the blanket?

ABRAHAMSON I think it's just too early to comment on that. We will first have to examine just why it is that they came off and that's still subject to investigation.

NITE And my third and final question, is there anything that's been learned from STS-6 that might bring about any modifications in the Columbia?

ABRAHAMSON Well it's a little early yet to look at that in particular. Actually what's happening is that we're finding some things on Columbia that we're now going to want to go back and change on S, on the Challenger vehicle that were not there. We don't have anything at this point in the flight that suggests that there's something that we must go back and modify on the Columbia itself. No.

PAO Okay. We'll move back to Dryden for just 2 more questions.

BOB MOON (AP Radio Network) General, maybe I'm missing something, but I don't understand how it would violate the privacy of a particular astronaut to talk about an incident of space sickness in general terms on that craft. We wouldn't identify anybody and yet we would be able to tell the people who paid for that spacecraft that there is a continuing problem up there with space sickness that needs to be solved. You talked about citizen flights in the future.

ABRAHAMSON For those who are vitally interested in this I really suggest that you follow very closely our data as we turn it out on the scientific side and I think you'll be able to see

exactly just what kind of a problem that we have. I don't think that it's valuable or useful to in fact go ahead and talk about well we had 1, 2 , 3 or so many and they were this sick or not. The important thing was, and this is what's important to the tax payer, is that it was not the kind of a significant problem that had any effect whatsoever on the mission. And that's the real issue.

CHARLES CURLY (L-5 Society) I, you mentioned that mission 8 will have a night landing. Do you know if that vehicle will be visible from the coast perhaps from the glow of the tiles?

ABRAHAMSON (Laughter). That's one I'll have to, we'll have to get you an answer on that. You may recall, and it was printed in one of the magazines, we have gotten infrared pictures of the satellite or of the spacecraft just as it comes in and that's a spectacular view but that's, that requires an infrared camera and I just don't know what we can see with the naked eye. But I'll go check.

PAO Ladies and Gentlemen I want to thank you all very much for your participation. This concludes the STS-6 Post Landing Press Conference.

PAO Okay. Good afternoon and welcome to the STS-6 Post Flight Press Conference. I think you remember these guys and before we get started into that I'd like to say we do have a recent status report on the TDRS satellite. There are 2 pages to that and it will be available in the news room for you after the press conference and we also have a telephone number for the Goddard Space Flight Center where you can get regular updates and that's available also in the newsroom. Okay. I'll just introduce the crew. Commander Paul Weitz, to my immediate right, Karol Bobko, Story Musgrave and Don Peterson and without any further delay I'll go ahead and turn it over to Paul to pick up, give you a little status of what happened in the last couple weeks.

PAUL WEITZ What we'd like to do and it's, what is apparently the most nominal flight of the series so far which is very gratifying from everyone's standpoint is Bo will talk to you a little bit about the ascent. We have some slides to use as supportive material for our presentation such as it is. Don will talk about the IUS deploy. Story will cover the EVA activities and I'll talk about the entry a little bit. Then we'll show our quick-look film and following that then we'll have some time for questions and answers. So, over to you for ascent.

KAROL BOBKO As you probably know we went down to KSC one day earlier. We had the luxury of having a little time to do that and it gave us a little more flexibility in scheduling our aircraft flights down there. And as it turned out there was a front that was moving through KSC and that we did cancel one flight and went a little later with that one. I don't know if other crews will have that flexibility but it was nice for us. I won't go ahead, I won't try to describe every feeling that we had during ascent just some of the things that were a little bit different to us. First, perhaps because we had been preconditioned, the solid rocket boosters didn't have as much vibration and weren't quite as much of a shock when they lit as the other crews had indicated. We both, we all thought they were less than expected and we got off to a nice smooth ride. Of course the Earth goes down awfully fast. After about a minute into the flight we all heard a crack in the cabin. We certainly don't know exactly what it was but 3 days into the flight we found out that a bracket that was bonded on the wall of the cabin had come loose. That bracket held the CCTV monitors and that seems like the most likely suspect. I know my eyes got pretty wide when I heard the large crack and I'm sure everybody else's did as well. Then it settled down and at SRB separation the vehicle was engulfed in the fire which results from the separation rockets that push the SRB's away from the stack firing. We had all heard about them but it was still a surprise. There really is a lot of orange flame around the cockpit when that happens and it's really quite something. I think it was PJ that commented over the radio when he saw those

go. We did find that there were some deposits left on the windows by the SRB or by the sep motors. After the SRB's left us everything was smooth, quiet and steady just as the other crews have told us. A little later on when we got up to a higher g-level one of the things that surprised me was the fact that there was quite a bit of force forcing you out of the seat along with forcing you back into the seat. We went up to ET, we went up to MECO and things started happening quicker. Of course, you're gaining velocity at a great rate as you're approaching MECO when you're at 3 g's. But the shutdown was absolutely nominal and the 3 lights went out showing that the tank had departed from the vehicle. There was a little bit of a surprise. One of us must have touched the stick and downmoded from an automatic sequence and we didn't transition into the mode for firing the OMS engines as we had expected and the ground asked us to do so and we did so without any incident, but we were all looking over the side of the vehicle to see whether or not the tank in fact did go away. I saw an orange glow off to my side and I'm sure it wasn't the tank but I can't say what it was because what is there out there to glow I mean you have to glow off of something and I don't think there's anything there that is to be seen. Once the OMS engines ignited they were rock solid. Of course, after the SRB thrust and after the main engine thrust the little OMS engines, or what seemed to be little OMS engines at that time, weren't much of anything. You hardly noticed the thrust. Then we settled down to wait the time between OMS-1 and OMS-2 and, unlike the simulations, we didn't have a whole line of emergencies that they had injected during the ascent and so we had a very leisurely time and could, could get ready for the OMS-2 and Don and Story started to get out of there seats and we started to get ready for our onorbit activities. The OMS-2 was, we were ready for it. It was relaxed. The engines could be felt but again they didn't seem very large and then we went from there into the post insertion which also was very nominal. The door opening was a bit of a surprise in that they operated much smoother than everybody else had narrated their experiences to us. The doors had no jerkiness. They just opened beautifully and smooth and they closed later on in the mission in the same manner. From the liftoff until we got through the post insertion, it was on time. Just about everything was nominal, a few small exceptions like the large crack I mentioned and we were ready to get started on the IUS checkout and deployment

WEITZ The large crack being a noise.

BOBKO Right. Not a crack in any structure.

WEITZ Bo is very kind. The one of us who must have hit the hand controller was me. We haven't gotten very good photos so far for the tank folks on ET SEP. They'd like to see the front end of the tank so I told them that as soon as we got into OPS 104, which is a post ET SEP mode of the general purpose computers, I would thrust forward to try to get that coverage of the tank. I don't remember doing it but I was the only one who

could have because it took the translation hand controller to do it but in my, apparently, in my haste to get in position in order to give them the good pictures of the tank I interrupted the sequence and therefore didn't get them any good pictures of the tank. So I've appologized publicly to those folks. It was a procedural error and in no way requires any change on my part nor will it require any change to any hardware or onboard procedures. Don, do you want to pick up and talk about the IUS deploy?

DON PETERSON Okay. What I'm going to do is show you a few pictures that we made out the back window to give you some idea what the sequence looked like and before I start doing that I want to tell you that we're going to address the IUS/TDRS deployment only up through the time that it essentially departed the orbiter for a couple of reasons. Number 1, that's essentially where the crew and the orbiter's support for the payload ends and also where we lose most of our data and command and control capability. Also, of course, some things happened to it later that we frankly haven't had time to become really familiar with. I think we were surprised by that because in the course of our 10 hours or so on orbit before the time we deployed it we had seen less than, well, let's see, about a half a dozen minor anomalies none of which we thought in anyway affected the capability of the IUS and TDRS to do their job and when we deployed it as far as we were concerned it had a clean bill of health and we were delighted with it. Let me jump into the first slide. Okay. This is what it looks like out the back window and I guess the couple things I ought to point out. Number 1 up in the left inside is a ghost image. You'll see that in a lot of the photography because the panes of the windows on the orbiter are, it's like the window has 3 panes of glass. It's 3 panes thick and what you get is a reflection between or amongst the panes of glass and you see that kind of ghost image on a lot of things. The main points to look at here are first of all the size. This payload's 46, 45-46 feet long. It occupies most of, of course, the 65 foot bay and it's stowed aft so that you have some open area up in front. Another point you might notice is the little drum shaped things along the side here. Those are the canisters that house the Getaway Special and we'll try to talk about those later perhaps. This is the way we first saw the thing when we got to orbit. It's latched down at the front and it's in a tilt table mechanism at the back. Go to the next slide. This is the elevation at 29 degrees. We essentially released the front latches, which you cant' see very well, but there in this dark area right here, on each side, drive the aft tilt table up to 29 degrees, we stopped there for a couple of reasons, number 1, we have an umbilical that supplies power to the payload, and you can't see it very clearly in this picture, you'll see it better later on. And if we go higher than that we have to disconnect that umbilical and we want to keep the IUS TDRS on orbiter power until we're through checking it out, so we keep the umbilical attached at 29. The reason for elevating it all is that we need to get the antennas up out of the payload bay so that we can check them out. In doing all of this, and I guess

we could go now to the next picture which shows that at the next stage of elevation, this is at 58 degrees. And now if you look closely, that's the umbilical attachment right here as disconnected from the orbiter, or disconnected from the IUS TDRS, rather. In all of these operations, I think we were impressed by a couple of things. Number one, the checkouts went very smoothly, the communication with the satellite was very smooth. There are a lot of motor operations to drive latches, and drive the tilt table, and in every case they operated faster than the check list required them to, and the motions were extremely smooth. We never felt or saw any evidence of any kind of vibration or ratcheting or any other kind of uneven motion, it was just a very very smooth operation. Let's look at the next slide. This is a much clearer picture that shows, this is the umbilical it took to the orbiter that brings orbiter power to the payload. It normally hooks up in this area, and you can see very clearly that is detached. In the course of this elevation, we obviously watched the thing visually out the back window. We also have cameras mounted at the four corners of the payload bay, and the two in the aft corner, there's one there, there's one over on this side. We use one of those to look at what looks like a protractor scale, it's mounted on the tilt table, allows you to read the exact angle of the tilting, and I think later on in the movie, you'll see that. We were able to tell exactly what angle we were at and everything proceeded very, very smoothly. As we came down across Hawaii in the last pass prior to deployment, the ground had done their checks, they gave us the go for deploy. We checked everything on board and it all looked good to us, and we deployed. Next slide. I guess this is the, for Story and I at least, this is one of the highlights of the mission. You can see that the satellite has essentially cleared this mounting structure in the back there, and it's starting to move out on its own. And another thing that we noted here was that when this event occurred, I guess we expected some reaction in the orbiter, we expected the orbiter to rotate a bit, we expected to feel something or hear something, and it was absolutely quiet and absolutely motionless. We didn't get any kind of vibration or impact or any indication, except visual that this was happening. And as a matter of fact, Story had punched the button to release it, and for a split second I wasn't sure anything had happened. And except for that camera right there looking at this NOSL when it was down below there and seeing it move, I wasn't really sure we were deploying. And that's how smoothly it went. We, of course, continued to watch it as it deployed and the motion of the satellite combined with the motion of the orbiter carried it first up over the overhead windows and then down in front of us for a while, we watched it out the front windows and finally as we maneuvered for our burn it went off to the right side a bit, we watched it out the side window. We had visual and photographic contact with it for a long time. And I guess the most spectacular part of the deployment, next slide please, was when it hit the sunlight. That's a ghost image in the window. This is what the thing looked like when it first went into sunlight. We were, the orbiter was still in darkness as we

came across the terminator, and it lit up literally like a magnesium flare, so bright that you could hardly look at it. We had our cameras set for shooting at in daylight, but I guess we really didn't have them set properly for that much light. But we got a couple of pictures and it was really spectacular. As I said before, I can't really discuss post deployment, and I don't think I should try here. But at the point that we released it, we felt so good, Story and I were rummaging around for the mission whiskey.

MUSGRAVE I'll discuss the extravehicle activity or the spacewalk. The thing we wanted to test and evaluate there was our ability to do construction type work repair type work in the environment of the Shuttle orbiter. We wanted to checkout our suits and the life support systems on the back that we call EMUs. We wanted to evaluate how we checked them out before we take them into the airlock and depress and take them outside. We did have three suits onboard. We wanted to look at our ability to move about in the payload bay, up and down the longerons, or up and down the long distance of the payload bay, and of course the bulkheads, fore and aft. We wanted to look at our safety tether dynamics, the safety tether we wear to be sure that we stay connected to the orbiter. We wanted to exercise various tools, winches. And, in summary, our basic ability to do work, constructive type work, or repair type work in the environment of the orbiter. Now the suits, or EMUs, performed extraordinarily well, all the checkout we did. And after flight 5, as you remember, we added on some additional checks to be absolutely sure, some very aggressive checks of all the suits to be sure that they would operate long before we decided to commit ourselves to the spacewalk, they all checked out extremely well. We wanted to exercise the airlock operation of depressurizing the airlock and getting outside. That went extraordinarily well. And the EVA accomplished all the objectives that we set out to do. We stayed on the timeline, the total EVA took about, right almost to the minute that amount of time that we thought it would. And we can get the lights down and go to the first slide, please. These slides will demonstrate as samples, sample data, some of the things that we exercised. Here Don Peterson there traversing the payload bay. You can see the handholds here, one hand on the handholds, and the other hand on the slide wire. We exercised translations, up and down the payload bay. We also exercised translations across handholds, which you can't see particularly well there. In this particular slide, I am routing a winch rope from a winch here, across here, and connecting it to, this is called airborne support equipment, that's where the payload rested. In case we were unable to stow that by the normal means, we were exercising a contingency task here to see that we could route a rope, put tension on the rope with the winch, and the next slide, please, and just exercise that typical task. Here you can see a bunch of tethers, this is slightly confusing slide, but if you look at everything that you can see in this slide, as being away from you. That's the far bulkhead, the far wall of the payload bay, except for this one

slidewire here. So this slidewire is really on the bulkhead or on the wall of the payload bay that is near to you. All of the rest of the structure that you can see is that part of the bay away from you. And I'm hanging out here between the two walls, I'm in the middle here and I'm exercising tether dynamics. You can see my safety tether right here. There's a reel and a cable that goes over to a slide wire that runs up and down in the payload bay. So that reel will reel in and out as I move a further distance away this slidewire, and the slide mechanism here allows that to slide up and down. So as I move up and down in the bay, a slide will move up and down with me. And as I go away from that slidewire, this reel here will reel in and out. Part of the tether dynamics was to study the dynamics of that safety reel, and also to study if you ever got off of the handhold where you were free floating, the dynamics as I am here, of grabbing the tether, I have a second tether, so I have total control. My safety tether here and another tether here. I added on this second one so I could study the dynamics of grabbing a tether orienting my body only by using these tethers and then pulling myself back toward a tether point. You can see parts of the suit structure in here, we evaluated the suit mobility. How far you can reach, how far you could exercise all the joints, such as the knee joints here, the hip joints we have here, and the various bearings. There's bearings in the thigh here, there's bearings in the shoulder, bearings in the arm. We exercised all of those things to establish in 0-gravity what the mobility, reach and stability is. Next slide please. You can see various components of the suit here. Here's the helmet of course, on the helmet are mounted lights here, there's the button for turning the lights on, there's actually four lights, two on either side. We evaluated the lighting, in both sunlight, in night we evaluated the payload bay lights of the orbiter, and also, these lights were extremely effective. Here's the backpack here, the backpack provides the oxygen, which pressurizes the suit, it has lithium hydroxide in it, which absorbs the carbon dioxide from metabolism.
It's also has a sublimator which evaporates water and that's the way we achieve our cooling. So the life support system that we use for cooling, for providing of oxygen, taking out the carbon dioxide is all in the backpack here. This is the display and control module here that we run, our extravehicular mobility unit. All the switches and the light emitting diode here to tell us what the status of our suit, the status of our life support system is read right here. You can see a work station, a mini work station in which we tether ourselves or tether tools, it is in this vicinity here. Here's the slidewire and here's the slider here which slides fore and aft, up along the payload bay as I mentioned before. The next slide please. Here's another task we looked at it, and that is transferring what we called a massive article. This is a bunch of centerline latch tools that we use if we ever had to latch up the centerline of the payload bay doors manually because we're unable to do them in the usual fashion, we have several tools in here. But for this demonstration, it just provided a very heavy article that we

could practice maneuvering around in the payload bay. And the lights, please. In summary, we had a very aggressive DTO to prove that we could take the Shuttle suits out into the payload bay, study how they perform. They performed extraordinarily well, we demonstrated that we can do constructive and contingency repair type work in the orbiter.

WEITZ We just got a few incidental photos that we can talk about next if we can have the next slide, please. We wound up with some objects that would disappear or change location, books, film, cue cards. And this green-eyed critter in the suit here is the guy we feel must have been responsible for it. Next slide. These are the loose pieces of insulation back on the OMS pod that we discussed. Some folks got the impression we were concerned about the fact the pods, the insulation was loose, that was not the case. I was not convinced that they were going to survive reentry in that condition, so I just wanted the folks on the ground to get as good a look at it as we could give them in the event they weren't there when we got back to possibly give a little insight into the failure mode. But you can see the two pieces that are projecting up from the top side of the OMS pod, and there's another, Bo, you can put it down on that rope, there's a piece of insulating, it looks like a piece of clothesline, about 8 or 9 inches long, it's protruding out from underneath a section of the blanket. That's the portion of the blanket that isn't there anymore, so I suspect that that rope is long gone also. Next slide is something we never got tired of looking at, this is a fairly good photo of a sunset or a sunrise, they look the same, you run it forward one time, and it runs in reverse in the other time. But we never, I think most of us never got tired of looking at this. Next slide is the lightning experiment, and I'll turn that over to Bo, who was the prinicipal data gather for those folks.

BOBKO We simply had a 16mm camera and made comments into a tape about lightning that we observed, and we took I think 5 or 6 magazines of storms that night. A couple of the storms were over the Gulf coast during the day. We haven't heard any of the results but they do make rather nice photographs. Next slide, please. The Ganges River delta was clear as we flew over. And we have a number of pictures to form film strips taken a number of times. We were told that people were interested in that to see how the delta is changing as time goes by.

WEITZ The significance of that is that we've been trying to get decent picture of Gangees River Delta for quite a while from our manned flights anyway. And it has been unsuccessful so far, usually do the cloud cover, and this was one time, for a period of days, that it was relatively cloud free.

BOBKO However just east of this area is the area just east of the Himalayas, and we try and get pictures of that, but it was always cloud cover when we were passing over. This is Katar and Bahrein, and the oil spill that has occured in the

Persian Gulf is coming down from this direction. And as we understand it, gumming up some of the desalination plants that provide fresh water, and so we were asked to try to get pictures of that area, which we did. We didn't think that the pictures came out very well, because there was some high cloud cover, but they seem to reasonably well. Some of the people that have looked at them say yes, they have been able to see some of the oil, but I'm afraid that I can't point it out to you without having some doubts in my own mind that I'm absolutely correct. Next slide please. This was in Gulf of Oman near the Persian Gulf, and you can see tankers that are sitting offshore waiting for cargos. The surprising thing was you could see them with the naked eye, you know you can usually see ships wakes or contrails, P.J. looks for ship wakes, I look for contrails. But we were surprised that this one took a photo. Next slide please. This is a picture of some of the Macran Mountains, which are the mountains in Iran and Pakistan, going on into India. And it's a place where continents are in collision, and they have folded the Earth, and these mountains have resulted, and there's some rather spectacular swirls in the Earth's crust and mountains which resulted from this collision. The next slide please. This is the junction of the White and Blue Nile in the Sudan and Kartoum, it's up in this area. And these are the cotton fields, where they grow the long staple cotton. It's surprising how much you can see from orbit. And, as you all realize, the pictures never quite do the scene justice, it's always better to look at it with your naked eye. Next slide please. This was a dust storm in Mexico, and it's in northern Mexico, I understand in the state of Chihuahua and the United States is up in the background. But that was interesting and it was surprising how much of the Earth's surface the storm covered. Next slide please. I just took this picture because it was pretty, but there was a low sun angle and good shadows, and the shadows really defined the extent of these thunderstorms. It was taken probably over Africa. However, there is enough haze underneath in the atmosphere, that's very difficult to make out exactly where we are. We have two of these, so it makes a stereo pair. I haven't looked at them in stereo, but I understand they really stand out in stereo viewing. Next slide, please. And we took a number shots leaving Florida over the Bahamas and this is one of those beautiful islands, Eluthra, that's worse than the Moon. But you can see how the wind has caused a band of clouds and you can see the island itself and the deeper water and the underwater relief is clearly visible. And again, it's ashame we can't really show you what it looked like because it was even more beautiful in the photographs. Okay, can we have the lights please.

WEITZ I cannot say, from my own personal standpoint, how pleased I was with the performance of this vehicle. I knew the crew would perform. I had some reservations about the vehicle, frankly, not because of any specific indication or any particular item. I just thought that you know you have shakedown cruises for ships. Boeing when they built their 1500th or 2500th 727 before they shut the line down. They fly it with a minimum crew

on a checkout flight just to make sure everything works right. Frankly I was, in my own mind, mentally prepared, I didn't tell my friends and cohorts that, but I was mentally prepared to suffer the disappointment of coming back after 2 or 3 days due to systems funnies, malfunctions, malperformance, whatever you want to call it. And I just can't say too much about this vehicle which demonstrates to me the maturity of the entire Shuttle Program, the Shuttle Transportation System. We can obviously build vehicles better, we know how to test and check them out. It costs us some time, some schedule time in this particular case but I think that hindsight we can now say that it definitely was worth it. It also shows the maturity of our operating procedures. Our little bit of required contact with the ground just went super smooth. They were on top of everything but again that's because we had such super smooth vehicle. I'm sure you're aware of the significant anomalies. We had an av bay fan, an avionics bay fan that gave indications of clogged flow although another fan in that same bay performed nominally. We had a short circuit on a humidity separator on flight day 1. That was protected by circuit breakers. They opened and protected the vehicle and the electrical system and we got by on our redundant humidity separator for the rest of the flight. We had a couple of other funnies including pressure control system demonstrate some anomalies. We think we understand those. We know how to cope with that. We had on the last night of the flight our most significant failure which was a failure of the general purpose computer number 2 which just took off, headed south and departed for parts unknown on its own for a reason that still is not fully understood because, as I'm sure you're aware, we powered it back up, brought it into what we call a redundant set the next day to do its thing with the ground having taken the appropriate precautions to not give it any critical functions to perform in the, what we call the string assignments, that is, the functions that are performed to the various computers which we can juggle around. But it stayed in all the way from the time we brought it up the morning of entry day until the GPC's were powered down. Yes it hung right in there and did its right thing so we don't really understand what happened there. Probably it was a computer hardware problem but that is not fully understood or appreciated at this time. Anything I overlooked on that? It was a comfortable vehicle. We think the temperature control was a little better on this than it is on 102. We kept setting the manual temperature controller to a warmer and warmer setting as we went on. The STS-5 crew had complained about how hot they got in the cabin during entry so we made sure when we got up on entry day that we went to full cold on the temperature controller and that that, shortly after that we started adding layers of clothing and you can see in the movies when we got out of the thing on the runway we got extra shirts on and it really does a good job. You'd rather by far be a little on the chilly side than be too hot.

BOBKO I was just going to expand a little about the GPC. We had the failure and we did our checklist procedures. We knew

that there was a ground station pass coming up in about 5 minutes. The ground station pass was 6 minutes long, I think, 6 minutes long. They must have been very surprised as we were very surprised when the GPC went down and before the end of that 6 minute pass we knew exactly what we were going to do and had a plan set out for the night. We did 2 more, we did a dump of the GPC memory, of the failed GPC, and essentially went to bed with them looking at that information. So it was, I thought, handled in a superb fashion and we were all very comfortable with what happened and really pleased with the tremendous response we got from the ground. In a few minutes we had it all taken care of and when we got up the next morning we tried it and it worked. And it worked all the way through entry.

WEITZ Yeah. We were already about an hour into our sleep period of the last night and I could just see it while Bo and I had already gone through the malfunction procedures for GPC failure in that situation and were waiting to consult with the ground. And I was mumbling at least to myself if not out loud about here we go we're going to spend 2 or 3 hours playing with this damn machine trying to get it to work right and trying to figure out how it failed and it's not the way it turned out. I cannot say too much about in that short a period of time, in a period of 4 minutes, from the we hit them with the news of what happened until they totally put together a, the control center put together a plan and put it into effect. In that 6 minutes they said, okay, good night, we'll see you in the morning. And that was a very pleasant surprise. Well we arose on time on entry day, and again, everything went per the checklist on time. The deorbit burn was smooth as advertised. We did notice one thing. We're going to recommend a change in procedures is that we have once we get out of OPS-1 which is the launch, the ascent operational mode of the computer software we have what's called the hot stick downmode capability in which case if you're flying on the autopilot I can knock down the autopilot and fly manually just by moving the controller, the hand controller out of detente. And we must have inadvertently bumped the stick between us the two of us at least 5 or 6 times, I would guess, while we're sitting waiting for it was mainly post deorbit burn while we're sitting waiting for EI.

BOBKO One of the surprising things or one of the things that happens is when you're in 0 g your arms naturally go to a position about like that.

WEITZ And your body tends to straighten out to you're ride higher in the seat then you sit in 1 g.

BOBKO And your hands are out in front of you. I know perhaps one of the first indications I had that we really had started to pick up g's after we had come back into the atmosphere was I looked down and found that my hands were in my lap. I mean they weren't up here like this you know and I think it just makes it a lot easier to bump the stick when your hands are in a kind of an

unaccustomed place.

WEITZ Yea, well I think if I was bumping it, it was with my leg so but anyway we removed power from the hand controllers and that fixed it. We had it on the fly and note to our entry checklist at the appropriate time to turn the hand controller powers back on, the flight controller powers, and that took care of it. Deorbit burn was good. Golly, it was just such a smooth ride all the way down I don't know what to say except that just before we came into sunrise we could start to see the ion sheath out over our nose, Bo and I could. The thing that surprised me was that even after we came into full sunlight, and Don reminds me of what is going on from a physics standpoint and he's correct but nevertheless it still surprised me, is that even in bright daylight I could see one time for example, I forget whether it was in the first bank or the second, after the second reversal, I forget which now, but the vehicle is in full bright sunlight but in the shadow of the orbiter I could still see the pink glow of the ion sheath and it just surprised me and it's kind of a gee whiz thing to see and I wish we'd all have the opportunity to see what STS-5 did when they made, when they encountered the atmosphere in darkness. G onset was gradual. Subjectively, it felt like on the order of 40 to 50% more g's then we actually were pulling. We saw the California coast as we came up on it at about mach 5. You can feel, you know when you're coming in a 40 degrees angle the attack even though and you're slowing down, you're starting to take energy out of the vehicle but the acceleration vector is essentially upward so you're pressed down into your seat. As we got slower, as I'm sure most of you are aware, we decreased the angle of attack, pitch over more, and as you approach mach 4 to 5, in that region there, you know that you are really slowing down. You can just feel the acceleration vector go from essentially straight down. You can feel it starting to move forward and as you do you are just pulling forward in your seat. And again, that all makes sense but it just surprised me a little bit. After the fact, it doesn't but at the time it was kind of a gee whiz thing. We did our last reversal, a turn from a left bank to a right bank. Bo said he saw Edwards, west, south, southern California was absolutely wide open. We were on the groundtrack. Everything looked good on our displays onboard. It was verified by the ground. We headed on in at, autopilot turned us on to the heading alignment circles cylinder cone, whatever it is now, the heading alignment C and once we got established on the HAC as it's called I went to CSS, flew it around manually. We were going because of the relatively strong headwinds to what's called a close in aim point. As we're on the 19 degree glide slope nominally for low wind or no wind you aim your velocity vector at a point that's 7500 feet from the threshold of the runway. Just to get us a little pad we also have in the guidance and used to when Edwards was still a dry lakebed before it became a seaside resort, have a triangle or a rectangle or whatever, was painted at 6500 feet. Well, that's been wiped out by the waters out there.And when we came off the HAC and I looked throughout through the HUD, I had been looking

outside the window up till that point and it just surprised me because the HUD runway was overlayed as near as I could tell, precisely on the real world runway. But the aim point didn't seemed to be in the right place. Well the HUD gets its inputs from guidance and it ought to know where we we're going, so that precipitated a conversation between Bo and I as to where guidance was taking us. And it turned out that he had total confidence, I wasn't sure and he was right. So it was taking it to the right place, but that is the, it's the little things that kind of cause you to depart from your planned sequence of events, that was the time at which I had intended to return control of the vehicle back to the auto system so that the flight control folks could get some time in auto on the outer glideslope and frankly I just forgot about it while I was flying it manually, while we were talking about where we were going. The HUD was a tremendous asset, I feel, toward making that subjectively from an operator's point of view, I thought was a relatively smooth approach and landing. And the HUD really helped a lot. It, in conjunction with what you're seeing on the outside world, you still crosscheck inside. Don Peterson, both on ascent and entry is sitting, you know I sit on the left side, and Bo on the right and Don sits behind the center console in the middle, and it's his job to keep us out of trouble, which he did obviously a very good job of. But once we get below about 5000 feet, as Don starts feeding me, just in case, well both of us, in the event that Bo would have to take over, information over the intercom loop on altitude, airspeed, and you put this all together, but the HUD still helped, it helps a lot. So we got good indications on the HUD, the things were set up. We felt a little turbulence, one gust on final, on the final approach that my impression was that a gust came along and said, I'm going to get you, orbiter, and the orbiter just went in one side and out the other, and said you know, take that, you can't do much, because you know it's a 95 ton machine that's moving down there at a significant number of miles an hour and it just sailed right through it with no crew response necessary. The touchdown was nominal from my standpoint anyway, relatively smooth, and derotation, I didn't sense any drift until we got the nose on the runway, at which time I then sensed a little drift to the right, but it was not remarkable or alarming from my standpoint, I didn't hear any gasps, so you guys might have been holding your breath or something. But I think we did give the brake and tire folks a reasonably good shot at their DTO, their Detailed Test Objective. You may know, we have had some mixed and not very good results from the brakes. Unfortunately we have not had a chance to talk to the brakes folks, but from an operators point of view, is you couldn't have asked for anything more. There was not pull off of the brakes one way or the other. I applied max braking from 140 knots ground speed down to 90 knots and moderate braking after that. And during the moderate braking phase, then used differential braking to steer us back to the centerline, because we had to look good for the post flight photos to have the orbiter near the centerline anyway, and that all worked well. Also the, since everything was relatively nominal, the communications was,

control center were good. I think we got the vehicle ready for, to tow away in a new record time, and that doesn't say anything about us in particular, again it's just because the maturity of the program. Yes, if we could have, what I'll do, we got one more slide, if we can show the slide and then from that we'll go into the movie. That's what it looked like out the window, the question has been asked about what it is reasonable to expect in the event that an emergency should arise, what you can ask a mission specialist, or anyone in the back end to do and Story was standing up when he took this picture out over Bo's shoulder, and as a matter of fact, Story was on his feet through most of the entry. And I don't know what our max-g loading got to, I suspect we didn't have much wind at altitude, I'd be surprised if it got over a g and 1/2, 1.6 g, in there somewhere, so you can see it was a good clear day. The more yellow part at the bottom part of the window there is where the water is still laying on the lake bed. So when we can, if we can cut the slide and go to the movie. This is the ascent, liftoff, for those of you who weren't fortunate enough to be there, very fortunate from our standpoint, but I understand from the folks on the ground, it was one of the clearer days we've every had in Florida. When the solids get a hold of you right here, you know you're going where those solids want to go, and you hope that something keeps them pointed in the right direction, because you're on your way. The roll, as reported before, was not disconcerting or confusing in anyway. You know that's about a 90 degree roll there as soon as you clear the pad. As Bo said, we were kind of prepared for more shaking and clattering and vibration than we actually had.

BOBKO It's interesting to look at it from this prospective.

WEITZ We're approaching SRB SEP here. You can see tail-off. There are SEP motors and as I say, those cause it to fall away in the right direction at the right rate, and those are what subjectively I feel deposited the most gunk on the windows. As Don pointed out to you before, this is another view of the Tracking and Data Relay Satellite in the bay. This is since we were elevating it from the stowed position to the 29 degree checkout position. It moved, phase I used earlier in the, with management today, was that thing just moved majestically, it is quietly, silently, as a matter of fact, and almost inexerably, goes about its thing. This is as it was moving up toward the final attitude, 45 degrees, you can see on our protractor that Don had mentioned previously, was our minimum elevation angle, once it got to 45, if everything else was okay, that thing was going, whether we got to 58 or not. Now that's the nozzle of the solid rocket motor, and this is the instant of separation. As Don said, we really had to kind of check the television view from this aspect to see that it was in fact, had deployed. Absolutely perfect deployment, mechanically it came straight out of the ASE, the airborne support equipment, with no rates, just that again at it's 4/10 of a foot a second, which isn't all that fast. And now at about a minute after deploy, as we thrust backward toward it,

and you're not sure the thing is really clear of the orbiter, but that does cause you to pitch down also, or away from the thing. But it never lets it gets its attention when you're thrusting back toward a 17 or 18-ton piece of metal in the sky. The white part is the IUS, the Inertial Upper Stage. Here's where we started to thrust toward it and pitch down. This was later on flight day 3, I guess, whatever it was. This is the FCS flight control system checkout, we do it every flight on the vehicle. And that is Story operating the camera to take data for the Continuous Flow Electrophoresis System experiment. This is the one that's a joint venture between McDonnell Douglas and Johnson and Johnson, which they have every confidence is going to have direct earthborne aplication very shortly. He was taking some photos of the streams up there and down here, he's getting ready to changeout some samples. Don was basically, he was the housekeeper, and you can see that he kept a nice, neat ship down here. Not a lot of trash and equipment and items hanging on the lockers and on the bulkhead and that really helped a lot. And this was flight day 2 here while Bo was telling the world about the getaway specials. As Don mentioned previously, they were mounted in those three canisters. We did an antenna test which necessitated us getting crossways to our velocity vector and then rolling at 2 degress a second. We took some pictures of it and I'll tell you it was a little more impressive from onboard than it is here. But nevertheless, it was a welcome diversion from just going around the world with the payload bay facing the earth all the time. This is on EVA day that's Story and Don in the airlock beginning their prebreathe. You know requires 3 and a half hours of prebreathe on 100% oxygen to make sure or to have better assurances that we've flushed nitrogen out of the system so folks don't get the bends when they're exposed to the lower pressures in the suit. Bo was cleaning up the airlock and making sure that everything was ready for them. This photo was taken through a, no this is from the aft TV cameras. That's the airlock hatch being opened in preparation for airlock egress. And this is Story. Okay, a butterfly coming out of its crysallis I guess except he ain't near as pretty. But he has to come out and hook up the safety tether which he mentioned before and these are some translations I guess, is that you Story, going back along the starboard handrail, along the starboard lounger on toward the aft end of the vehicle. And these are both folks, Story in the foreground was moving back and Don was preparing some equipment up at the forward end. You see the two windows up there in the aft bulkhead through which Bo and I were able to keep tabs on what was going on. We were in constant radio communications with the two EVA crewmen as they were with each other. So we had a duplex com loop set up there and the ground when we were over ground stations could talk to any and all of us also. Don here is back at the IUS tilt table. This is in the aft end. He's using a ratchet wrench here to reposition some equipment. Story mentioned before their practice run through of the IUS tilt table restow mechanism for which we have an EVA procedure. That's just kind of a gee whiz thing. I tell you, this thing really does have a Star Wars effect. 65 feet is a

long way back and that's a big vehicle and it still surprises you. You look back, you're in orbit, you're in a spacecraft and the damn thing's got wings and a tail. I just seems innocuous and when those guys were in the back end of the vehicle they were far enough away and everything just absolutely silent. You know you're gliding over the earth due to some fortunate magic and they're back there having a heck of a good time in this case and it really does have, it's more Star Warsy than Star Wars I think. Except Star War spaceships have wings also. This is as we were going down. We were fortunate here. That's the west coast of Mexico just below Guadalajara where it kind of bends from the southeast to the east southeast so we were zinging right along the Mexican coast which has no significance except I think it makes for a nicer looking picture than if you had nothing down there. You notice on the fin the rudder is offset to the left a little bit up there. That kind of surprised me. It turns out in talking to folks afterward that the flight control system checkout leaves the rudder parked to the left and it's nothing to be concerned about. That's just what it does. Now those were all daylight scenes. Here are some with, the film compensates for the lack of overall illumination in the cargo bay. I think Story mentioned that the helmet mounted lights were for all practical purposes essential and that the payload bay flood lighting was not adequate to do your task. So here he's using the EVA winch that is utilized for several different tasks. This is on the forward bulkhead and it's routed down to, he just pointed to an exergenie down there which is used only to provide a load on the, on the line that we use. Here we're doing some suit mobility checks, kind of reach envelop determinations, suit stability and mobility evaluations. Seeing if there were any objectionable lockups in the, in any of the bearings. See if you could put it in one position where you wanted it, keep it there, so-called neutral point. Performance of the EMU's was just like the performance of the vehicle. There was, we've had some bad starts but they all, they both worked like champs in this particular evolution. And we're very gratified by that also. This is getting back into the airlock. Turns out we have a little work to do on, the term Story used as choreographing this evolution and that's a very good term I think is that, as far as our procedures for getting out of and into the airlock. This is on the last day of the flight when we had our impromptu conversation with the Vice President. We decided, we were notified during the flight that we had the dubious distinction of being the, in average age the oldest crew to ever fly anytime, anywhere. But these were taken from the TV photo chase on return to Edwards. You can see the weather was as good out there for entry as it was at, in Florida for the launch. This is through the HUD, through the head up display. This is a third or fourth order conversion of this and I'm sorry it just doesn't show up as well as it does on the original. You can see that those green symbology, the green symbology is displayed on the HUD. Here we are in the flare. Preparation for landing. This almost counts as a carrier landing as you'll see in the next photo by an over water approach here. (Laughter)

PETERSON Edward's dry lake bed.

WEITZ Right, the former, Edwards, former dry lake bed. Speed brakes are starting open. Our standard procedure as soon as the main gear are ondeck I call speed brakes open and Bo manually opens the speed brakes to help impart some drag to it. Some folks out there by the side of the runway said they could see a little bit of smoke coming off the tires during the max braking part of the test but I only heard that from one folk I think. I don't know if that was actually so or not. But anyway, it's starting to come together, folks. The whole system is, I think we're on our way. It did feel good to be back on the ground again even though it was a tremendously exhilarating experience. But that is just such a huge, impressive vehicle especially when it's sitting on the ground. Our postflight walk around such as we were permitted to do. We couldn't get around the aft end of the vehicle because of the, they were making sure that the propellants for the OMS and RCS were all secured. But it looked in, in just absolutely super shape and I don't know, what is the last count on tiles that have to be replaced? I think it's like just 30? Something like that. I mean obviously there's a concern where that new insulation on the OMS pod was severely eroded on the forward edge, leading edge of the pods and obviously as you can see from the onorbit stuff is it, they were fine when we started the deorbit. So it happened sometime during entry and we don't really, as best I know we don't really know when. Anything else before we throw it open to the floor. You guys want to add to that?

PETERSON I would say one thing that, that the quality of the film, I think doesn't show the quality that we observed in the master copies of some of this stuff, but some of the master copies are really sharp and clear of some of the VTR sequences

PAO Okay, we'll go to questions here at JSC, and if I don't call on you by name, please state your name and your affiliation and wait for the mike to come around to you. Do we have questions? Olive Tally.

OLIVE TALLY (UPI) P.J. and Bo have both alluded to how they felt about it and you described it a little bit, but I would like Story and Don please, to sort of share with us please some of your emotions that you felt when you walked out, or however you got out of that hatch, and what you felt as you are hanging out off the side of the orbiter.

WEITZ Before they start, let me say one thing, the week before the flight, Don came in with request to our flight control teams, that he said, doggone it, while he was out in the cargo bay, he didn't want to just look at the Earth we've been looking at for three days, he wanted to see some of the stars. So they were kind enough to oblige us on that, so on one pass there, we just went to inertial attitude hold at local noon, and that kept

us in the same attitude inertially, so as we got to the other side, the dark side of the Earth, our cargo bay was facing toward the sky. And they gave us a better view, I think it made for some better pictures, a little gee whizzy, it wasn't necessary for the test, but I think it gave Bo and I a little better view, while these guys were conducting in their perfect EVA.

MUSGRAVE I think that change of attitude would certainly encourage some different kinds of feelings, or different perspective of the universe, and of the Earth. I was looking for some, I don't know, some kind of existential experience, or some being, or some kind of physical phenomenon to, you know, to really grab me and tell me I'm not still in the water tank. I know just what you're asking for, and I was sure looking for it. There's no question, the view out there is absolutely fantastic and the amount you can see of the Earth, we didn't see any stars, I didn't see any stars. And the Earth is really going by fast, even though you're up between a 150, 170 miles, you can see an awful lot and the Earth is going by really fast. For me there was no concept of falling, and the Earth was not down either. We looked down, I would see the Earth but it wasn't down, and if subjectively you could hand me something, and you know I would take it out and drop it like that, I would not expect it to fall. So I did not feel like if I let go of things that I would fall. The zero gravity had already, you know, grabbed me for some period of time. So there was no concept of falling or if I dropped something, that it would fall, it would really just stay right there. And likewise a separation phenomenon of separating from the Earth, really the orbiter was home, and that was the perspective, and the payload bay was the perspective. And in terms of the operation out there, in terms of the translation, in terms of the feeling and all, the extrapolation from all the training and preparation down here to out there, it really worked, as it has in the Skylab program that P.J. flew on, and the J missions Apollo, where you were in zero gravity at EVAs, that extrapolation really worked. But the view is fantastic, it's going by very fast, but on the other hand for me, the Earth wasn't necessarily down. Neither did I have any falling, or separation phenomenon, and really the orbiter itself was my frame of reference.

PETERSON I think I agree with most of that. I felt very comfortable, along from time to time, and I hope there are no psychologists and psychiatrists listening, I have a dream that I'm flying, not in an airplane, just flying. And I think EVA comes very, very close to that. I think when I first climbed out of the hatch, I climbed up on top of, you won't probably another term, the toolbox, it's up on one corner of the payload bay. And from there, the door was open down on one side and the cabin was curved back this way. You can look out through there, there's about a 120 degrees of absolutely nothing in front of you except the Earth and the Sky. And that's kind of an awesome view, and I really enjoyed that. And by the way, what Story said was true, we asked for this maneuver so we could look out and I thought,

boy you ought to see a million stars, it ought to really be beautiful. And it turns out there's enough light in the payload bay, that your eyes don't get dark adapted very well, I guess, and if you stand in the middle of the payload bay, and look out at the night sky, it's looks black, but you cannot see stars. If you got up in a corner, like I managed to do a couple of times, you can see stars. And you probably see about the same number of stars on orbit that you do from the ground. I think that's because of the lights. But I also agree that I had no, from about the first 5 minutes after we cut the main engines off, I never again had much of an up, down reference in terms of any instinctive feelings about falling or dropping anything. You find that, or I found that you adapt very quickly to the concept of 0-g, and I think your frame of reference moves with you. You adapt to what you see visually, you don't have a sense of up, down, the way you do from holding yourself erect in a gravitational field, or pressure on your body or anything. And it was all in all a very pleasant sort of feeling, and a secure kind of a feeling. I never once worried about separating from the ship, or the tethers not working or slipping and losing my grip on a handrail. I think I just went about the work in kind of a business like fashion, and we did a lot of things, we did not have a lot of time to just play around. But when I did get a few minutes ahead and I could stop, I think I'd have to say most of what I experienced was a great deal of pleasure and just from looking at things and seeing the Earth in different perspectives and seeing the colors and looking at the orbiter from a different perspective.

MUSGRAVE The sun goes up and down in a matter of a few seconds. You know, it's like someone turned the light out, it doesn't take 1/2 an hour for the sun to go down or come up the way it does here. When it's coming upon you, no time at all, the sun is down or it's up. The sublimator is putting out these little chips of ice which float away and it's like twinkling stars here and there right up close to you. The things like that that are really exciting.

WEITZ Some things are unexciting, however, and that is that, you know during the Apollo program and thereabouts, we came to refer to the Earth as a blue planet, and even during Skylab which was 11 relatively short years ago, is that I remember making a comment postflight, that the sky is blue, whether you look down through it or up through it, and it was a blue planet. Unfortunately, this world is fast becoming a gray planet. And it was frankly apalling to me, to see how dirty the atmosphere is over nearly every part of the world that we had the opportunity to see. And that included some parts of the oceans where they're close to the continents. But just take a look, if you remember what you could see in that view of the thunderstorms that Bo took, and that's over land, folks, that was over Africa. And Dick Underwood, over here in the corner has looked at more photos, good photos taken from space than probably any other human being. And Dick says that he can tell the

difference, he can show you pictures of the same area side by side, over the last few years, in which our environment, apparently anyway, is just flat going down hill. And I don't know what the message is, but I think that it is not all related to dust storms and volcanoes, because it has a blue haze to it, and looks to me like smoke. What's the message, I don't know, we're fouling our nest some way.

PAO John Getter in the back.

GETTER I have two questions. To start with, it's a follow-on to what you just said, Mr. Weitz. Would you compare as best you could, you talked a little bit about star wars and that sort of thing. Would you compare flying the Apollo capsule up to an orbiting Spacelab, or Skylab, to flying the space Shuttle up into space, the feeling of it, the advancements that you've made and just the emotion of it, how does it compare?

WEITZ You have the feeling, I would anyway, if you were doing the thing with an orbiter, that you've got a vehicle with a little more capability. It's a bigger, more impressive vehicle, I think once the thing is done, you probably have a greater sense of self-satisfaction, because you're maneuvering something that weighs, on orbit we weighed 235,000 pounds or there abouts, as opposed to a command service module with a total weight of 35,000 pounds, something on that order. Some historian will have to correct me, maybe 50,000 at the most. You know the task really from a piloting point of view is essentially the same. We have, the Apollo for its day was a very, had a lot of capability, very flexible system and we have basically that now. So I guess it'd be all be subjective. I think the task is relatively easy. We understand the mechanics of rendezvous and close-in control and we're going to find out what we don't know about it here with a couple missions very shortly starting with...when does SPAS fly? Seven. That's on the next one. Did that answer your question?

GETTER Yeah. Second question for Dr. Musgrave and anybody esle who might want to jump in. You seemed a little unsteady on your feet on the runway out there coming down the ramp. Did this relate to the experiments you were doing that were trying to gain some insight into space adaptation syndrome and as an MD can you offer any insights now that you've been through a mission?

MUSGRAVE You have a little sea legs when you get back home. PJ warned us coming down the chute there that you're going to feel heavier and as he alluded to when you start pulling the g's there you do feel heavier. You feel like maybe you weigh 180 pounds instead of 150 or something like that. The g's, if you're reading g's on the meter and they're .8 maybe they feel like 1.2 or 1.3. So, I don't think any experimentation... but you know in terms of my sea legs and all of our sea legs getting back home that probably relates to adaptation back to 1g from the 5 days of 0g and whatever aerobatics and things I did in the 0g environment but I had sea legs coming back for about a day or so. The day

after, I played some racquetball and went running and was played about as good a game as I did the night before I left so that's maybe about a 24-hour phenomenon.

WEITZ I think, if I can interject, that frankly I was surprised that of the subjective sense of how great an acceleration field you're in after only 5 days. It wasn't as marked as it was on Skylab after 28 days but I expected that. I just frankly did not expect it here and I mentioned what it felt like during the entry. But when it came time to bail out and Bo had a couple tasks to do and I think he looked around for some help once and he was all alone on the flight deck. The rest of us, we were ready to get out. But as I stood up out of the seat to step over the center console it just aboslutely flabbergasted me as to what my sensation was as I raised up out of the seat I was immediately subjectively in a 2g field. And I think that what the sea legs as Story put it which is a very good way to put it. You know you don't have that sensation if you just stand even though you're still standing if you stand stock still. And, but it's as soon as you move your head or actually it's not only your head it's you limbs, but I really think it's your brain, your total system got used to working for several days, in this case 5, without any sensible acceleration environment. And now we put 1g on top of that and I frankly think that you get cross coupling, it's just like procession of a gyro. You're internal gyro if you stand still doesn't bother you. As soon as you move your head this way, and as a matter of fact I did it in the post flight physical, you could see if you close your eyes and move your head rapidly your gyro precesses a little bit and you tend to wobble because you're getting a false impression. But as Story said, I think it was still noticeable the morning of the next day but by the end of the day after landing that it wasn't there.

PAO Okay. Carlos Byars.

CARLOS BYARS (Houston Chronicle) For Story and Don. I noticed when you were outside that your feet seemed to always be floating above your head. Is this just something of the nature of the suit or of the activities? Is there a reason for it? Were you bothered by it, did is hamper you?

PETERSON I think the answer is that that has to do with the way the pressure in the suit and your natural body position positions you when you're hanging onto something with your hand. But no, I didn't, as a matter of fact when I looked at some of the films that you just saw for the first time I was surprised that my feet were as, at the angle they were. I really felt that my feet and body were more a right angles to my arm and when I look at the pictures I realize they're probably 20, 30 or maybe even 40 degrees up from there and at the time it happened I did not realize that at the time it was going on.

WEITZ Well let me say one thing. These guys were

operating down along the handrails along the threshold as anytime their feet got down there level as Bo and I would say "watch the radiators". So we were on them whenever they got, cause we don't want to kick holes in our radiators obviously or that certainly would've shortened the mission.

MUSGRAVE But, of course, you know the feet, the feet are not up and even the slides we showed you here are upside down. Most of the slides are upside down you'll notice the earth is up there and so really the feet aren't up in (laughter). We are in contact with the vehicle with our hands.

WEITZ Well, was it task oriented as opposed to any tendency. Was it a tendency or...

PETERSON I think it's just that when you grab something in that suit instead of your body staying at right angles your body tends to, your feet tend to angle out further behind you rather than up or down.

WEITZ As a matter of fact during the EVA, I mentioned to Bo, you watch these guys and this has gone since Ed White's EVA. You see guys move around except on the moon as long as they're in Og, you know they're moving around, they're doing all kinds of things with their hands and their upper torso and their legs are sticking straight out. I told Bo I said "you know if you're a professional EVAer you'd probably have your legs cut off because they don't serve any purpose when you're out there.

BYARS Let me ask you about the suits. These were a relatively low pressure suit but how would, how are you going to feel about going to the 8 psi suit?

MUSGRAVE If they give us the same mobility, stability and dexterity obviously that'll be an advancement.

BYARS Well, do you have any experience with the 8 psi suit Story?

MUSGRAVE I do have experience in 8 psi suits but not, not in a water tank or not in a Og environment. Just you know a 1g evaluation. It's a tougher job because you have to make, you have to make a joint insensitive to pressure. It's like, it's like taking a bread bag which is totally krinkly, you can do anything you want with it and blow a little bit of pressure in that bread bag and it becomes pretty, pretty tough even though know a little celophane bag. And so the more pressure you put in the stiffer it becomes and so all joints are somewhat sensitive to pressure and it's really state of the art to make a joint, even a little finger joint or an elbow joint, which is totally insensitive to pressure. Meaning the force it takes to bend it. How senstive is that to pressure. And especially when you get down to joints that are this small, it's difficult to design a joint which is pressure insensitive. So that's what they're up

against going from our 4.3 up to 8.

PAO Okay, we'll take one more here before we go to questions at the other centers. Paul Recer. Then we'll come back here a little bit later.

PAUL RECER (AP) After you're doing your EVA, have you concluded that the suit is in fact ready now for use on the MMU on down the line. Has the suit proven itself sufficient for that?

PETERSON Yes sir. Based on you know you're taking a data point with only 2 real samples but based on what we saw, yes.

PAO Okay.

WEITZ And that's all we can say, Paul. You know they peformed just like the vehicle did and performed well so we have no basis to say that they won't, but personally I would like to see a little more time on them before we say that they're 100% ready to go in all respects.

PAO Okay. We'll go down to NASA Headquarters for questions and we'll hit the other centers and then come back here to finish up.

PAO (HQ) This is NASA Headquarters.

CRAIG COVAULT (Aviation Week) I've got an EVA question for both PJ and Don. Paul, allow me to play devil's advocate a little bit. Towards the end of the EVA the ground called up permission, in fact, volunteered its approval for a 1 hour extension. What was your reasoning onboard at the time to call them back in and not carry on with that extension?

WEITZ Cause Craig it was, this was again equivalent of a first flight on an airplane and to me I used the same rationale that I used for stating that I felt that we ought to target the landing if all other considerations were equal to a lake bed. And I just felt that I frankly didn't like some things I saw on the characteristics of the airlock hatch when we opened it. I had no real concerns, I just wanted to get through the thing and do the things we wanted to and keep any surprises for later. In case we did run into a surprise, I didn't want it to be to where we had to hurry up. And basically it was just, to me it was another engineering test flight. We fulfilled the objectives of that particular test. And I just wanted to get it done, and we can start expanding the envelope some more on the next time we do it. But I had no particular concern at all, Craig. The guys were obviously performing well, you know the vehicle was going well and I just wanted to get it done.

PETERSON And if I could talk in the point of view, the folks outside, we felt great, and felt like staying out. But at the same time, you really can't argue with the logic P.J. just

used. We'd been out the prescribed amount of time, we've done everything we were supposed to do, and it was reasonable, I think, to stop. But there was no immediate physical reason to stop. We were both in good shape and at that point, both having a good time.

COVAULT Okay, we couldn't hear any of that in Washington, but I'm sure it was good.

WEITZ What can I say?

COVAULT I might have P.J. pursue just very briefly the EVA hatch issue he raised there, then I do have another question for Don.

WEITZ Well, and Story and I were both party years ago to the decision as to what type of hatch design we could come up. Can you hear this one, Craig? Hello, Washington.

COVAULT We've got you now.

WEITZ Okay. And you know the way it does, the hatch doesn't just hinge at the bottom and swing in, nor at the top, or either side, because you then have to make more room inside the airlock to get folks out of the way. We were going for, what at the time, we termed minimum sweat volume. So it's kind of on a yoke arrangement, much like we had in the MDA hatches, or the airlock module hatches in Skylab, so that it opens up off the hatch seal, and then kind of slides down, out of the way. And it's just that the geometry of that thing doesn't lend itself to just, like you would grab a hold a door in your house and unlatch it and swing it open. I think the thing needs some work, it's nothing that's dangerous. I just think it's a thing that needs improvement.

COVAULT Okay, and for Don, I understand your heart rate peaked up to about 130 there during part of the EVA, about double really, what Story's picked up. And I'm curious if that was task orientied or what pushed you to that level?

PETERSON I still haven't debriefed as to exactly when it happened, but there were a couple of times in the EVA. My basic job in the EVA was to support what Story was doing in the way of testing the suit and testing the mobility. And there were a couple of times that things didn't work the way we expected them too. We had some trouble adjusting one of the foot restraints, we had trouble with one of the winches and a couple of other things. And what that did, was threw us behind and also required me to do some tasks that I hadn't planned on doing. And it put me in particular, behind the timeline, because Story was for example waiting for me to get something done and so I was working faster than I normally would have been. And there were a couple of times that I realized I was working pretty hard. I don't think I ever reached a point where I felt fatigued or where I

felt it was necessary to stop. But I would suspect that the higher heart rates were just a matter of work load, a higher exercise rate in the suit. And that's about all I can say until somebody tells me more about exactly where they, what they correlate with in terms of time or activity.

WEITZ Yes. Craig, did you guys, did you see the movie all right, did you see that job he was doing with the ratchet wrench down on the EVA tilt table, or on the IUS tilt table?

CRAIG Yes sir.

WEITZ Those Boeing folks and our DOD friends also have a very strong feeling that they don't want any marks, dings, they didn't even want these guys, the EVA guys to touch their, what's that, the spreader beam, they feel that that thing must remain pristine, so that it can be turned around in time, hopefully to fly on STS-8. And that severely limited Don's availability, the availability of handholds for Don when he was down trying to do that job. And I could tell, that's about the time when he was trying to do that that we got the high 02 use alarm from his DCM. And it may turn out to have been a transducer funny, a shift, temporary shift to low. But I tell you frankly it didn't surprise me at the time, just looking out the window I could see that he was having a difficult time in getting the proper purchase and maintaining a body position so he wouldn't touch the spreader beam, so Bo and I wouldn't hollar at him for getting near the radiators. And he was just working very hard.

PETERSON The suits are heavy, they weigh about 400, 450 pounds when you put a person in them. I was trying to hold on, maintain body position with one hand and work a ratchet wrench with the other hand. And there was a considerable torque load on the ratchet wrench, more so than we had experienced in training. The combination of that just required a lot of hanging on and a lot of cranking with your arms, and it's fairly hard work in the suit. And there were a couple of other times that I was in a similiar type situation where I was using tools or something that again, working at a slower pace, wouldn't require much effort. But like I say, I felt like I was behind and that we should, I should try to catch us up on the timeline, and so I was probably working faster than I'm accustomed to working in the suit, and maybe faster than I needed to be. But I was just trying to keep us on the timeline.

JOHN BISNEY (RKO) We heard two comments on the day the Vice President chatted with you folks. He asked someone in Mission Control, if Karol was feeling better and P.J., you mentioned that when Story was doing a tumble, he was trying to make himself sick again. Without violating the medical privacy rules, I was just wondering if you could comment on those two remarks that we picked up on and confirm or deny?

WEITZ No. I cannot, frankly with our policy as it was

written before STS-5, and we now have a clear understanding of. And let me talk about space adaptation syndrome, is that it is not a debilitating condition. As Don put it, how did you put it earlier today, Don?

PETERSON Debriefed the managers this morning, and I said, I think a lot of people got the idea, you turn green and have open sores, and that sort of thing. And that's not really what happens. Based on what I know about it and previously flights and that sort of thing. At is very worst, it's not as bad as being sea sick. And I'm not sure we fully understand it, and I'm not a doctor, and I don't pretend to. But I think maybe we have perhaps by not talking more about it, we have given the impression that this is something that we're really worried about in terms of the well being of the individual, and I think that's not the concern. The only real concern is that if you've got a guy who doesn't feel very good for awhile, somebody else has got to pick up his work load until he feels better. And that's really the only concern we have.

WEITZ And you know to me, it's an environmental condition that we're going to have to learn to understand the mechanism behind and how to cope with it, just as for the same reason that British sailors came to be called limeys. They finally found out how to take care of scurvy and rickets, and the modern day one is sea sickness. We're working on it, we, the agency is working on a better understanding of the mechanism and how we can head it off.

BISNEY Alright, one other quick question for you. Were you aware of the severity of the problem with the TDRS and were you satisfied with the amount of information you received from the capcom regarding that?

WEITZ Well, I don't mean this to put down our friends at Goddard and Spacecom. Obviously we had an interest in TDRS. Our communication association however, was more directly with the IUS. You know, we carried the IUS up, and in this case it just happened that that IUS had a TDRS on top of it. It could have been anything else. We were disappointed to hear the problems, we still haven't been completely briefed on what the status, the situation is. I'm sure you are all aware is that there is an investigation underway to look into what happened, not some much to place blame, but as to understand the mechanism like any other accident investigation, an airplane accident investigation, understand what happened, so we can head it off again. At the time, I thought we have liked to have had some more information, because as I say even though I just gave you all the reasons why we remote from it, we still had a warm place in our heart for the TDRS, and wanted the thing to get up there and perform. But for the situation, at the time, is that I felt the information was given was adequate and Story had a little closer association with it and so did Don, maybe you guys don't feel that way.

MUSGRAVE I think we had all the information we needed, too. We had done our job and we could wait, we had to get on with the rest of the flight plan and we could get the rest of the details once we got back home.

WEITZ Why is the question asked. Does someone have the feeling that information was being withheld from us?

PRESS My name is Neil Lisson, I represent Argus South African Newspapers and I'd like to take you back, Mr. Weitz, if you would to the rather gloomy pollution picture you painted. Was this problem more noticeable in some areas than others or was it a rather universal problem?

WEITZ It was pretty much univeral, but I would say that it's universal because of the extent of it. I don't see how you keep that thing from spreading over land masses, but what surprised me is in some what you tend to think of as developing countries so therefore I can only assume that it's due to, and perhaps Dick can lend some insight into this, due primarily to the burning of wood primarily whether it be for heat and generation of energy and probably as in some conversations with him yesterday, great segements of the world were doing slash, clear and burn operations. But to me it had a heavy blue quality that I would associate with wood smoke. Now, Dick also tells me in some parts of the world it's due to the burning of soft coal, but it was pretty pervasive I mean it was in Indonesia we saw some of it. Even in New Guinea which you tend to think of as relatively unexplored jungles, in South America, in Mexico. Obviously, in this country where we've seen the deterioration of that in the last 10 years flying around in T-38s. The crud level gets higher and higher and higher. We normally operate around 40,000 feet and it's not uncommon to feel that you are not out of the crud layer yet at 40,000 feet at sometime.

ROB NAVIOUS (UPI Radio) For Story. Based on the performance of you and Don during the EVA, any reason to believe that the solar max repair mission next due on flight 13 would not be a successful exercise?

MUSGRAVE I haven't looked at all the exact details that need to be done there, neither have I gone through that exercise saying our water emersion facility. So, I think we need to look at all the data we collected not only our own experiences there, but we've got 5 hours of excellent closed-circuit TV and that kind of thing. We still don't have a total analysis of our performance out there and also for me to answer that question I'd have to look at exactly what the requirements were on the system and on the person to accomplish that.

WEITZ But there were no surprises. The suit performed as we expected.

MUSGRAVE No surprises.

PAO Okay. We'll go now to the Kennedy Space Center for questions.

RICE WAGNER (Spaceworld Magazine) Considering the way the Challenger handled on reentry, would you have felt confident coming into KSC and does it still look good for landing here for STS-7?

WEITZ Yes. With hindsight I'd have 100% confidence of going into KSC. At the time I wouldn't have but now as I say with hindsight I feel confident in our ability to land OV 99 at the Cape and whether it's going to land there on the next mission or not is going to be a programatic decision. I don't know where that stands.

BOBKO Of course given the day and all that we had to land it.

FRANK YOSENDA (Today, Cocoa) This is directed to the four of you. Following this flight what essentially do you think you're going to do in terms of plans and has the flight changed your life in anyway or changed your plans in anyway?

PETERSON I don't plan to have anymore press conferences. (laughter) No, I don't know. I think we're too soon after the flight for me to try to answer that. We're still in the midst of trying to get everybody on the Center debriefed from what we found, from what we've learned and at some point in time I think most of us are really looking forward to talking to the engineers and the flight controllers and the people on the ground and finding out what they learned because we've really done very little of that. And I'd like to get a couple of weeks off and I understand we have some public appearances to do and maybe after that we'll start looking at what's going to happen later.

MUSGRAVE Musgrave here. I don't think it's changed my life too significantly. It's brought to fruition something that I've been working very hard on for at least 16 years and I'm just looking forward to going again soon as I can.

BOBKO I think it certainly was a great experience. I'm looking forward to going back. I said when I find that I think at Ellington that I though I had imagined everything that could be see in orbit by listening to people who had flown over the time that I had been here, but that's certainly not true. It's beautiful, it's great, I'm hoping to be able to go back sometime.

WEITZ And I essentially echo Don's comments. Right now we're taking one day at a time, waiting to get all the debriefings behind us and to be able to direct our attention back to contributing to the program.

PAO Okay. We'll move now to questions from Marshall Space Flight Center.

JIM ADAMS (Channel 31) In the EVA in using the different tools that you used, the winch and the ratchet wrench, how did the use of those tools and how difficult it was to use it, how did that compare to the simulations you've done in the water tanks?

MUSGRAVE I thought our extrapolation from the water tank to Og was excellent. I think we felt very familiar in the operation out there and we really didn't have any Og surprises.

WEITZ Well, you're right. Maybe no Og surprises but as usual we had some job surprises and I think once again this is, it's relatively minor because we know how to cope with it. But, I think it shows adaptability of having man along and that Don had never really practiced that ratched wrench exercise in the water tank. There was some, we had a locking device on a set of foot restraints that we found out before the flight were over-torqued and the decision was made so that we wouldn't endanger the payload anymore that we'd leave it like it was and we'd fly a special tool to help Don who is responsible for that loosen it up. Well that didn't work either so we had to go to the tool box, get out a set of vice grips that he hadn't spent a lot of time practicing with and I think that, that is typical of our EVA experience, but Story's right in one way and yet in the other is that we did come up against some surprises only because they were unplanned-for events but that they found ways to cope with them and coped satisfactorily and Don did finally get that clamp loose.

PETERSON I'd agree with that and I think that the Og is not nearly as a big factor as just operating in the suit. The suit and the fact that you need to be fastened to your work station and you can practice all of that in the water tank are the big factors and not the fact that you're in Og.

DAVE DOOLING (Huntsville Times) I'd like for either Peterson or Musgrave to elaborate a little bit about how the electrophoresis runs went.

PETERSON So far as we know they went very well. We got a report this morning that said they had some shifts and some pump or flow rates within there and we countered that essentially procedurally and with software. We went into the control program and changed some operating parameters. Onorbit it ran very smoothly. We didn't get anything that was other than those couple of flow parameters that were unexpected. I understand also that post flight we somehow inadvertently someone in powering down the vehicle after we'd gotten out powered down the refrigerator in which the samples are kept for some period of time but the report is that that really did not damage any of the samples that they think everything came out about as well as could be expected. And the onorbit results based on the quick

look was excellent. They said they had fewer problems with bubbles. They understand more about the stability of the flow than they ever did before and they think the results are going to be as good as can be expected and I think they're looking forward to moving into maybe a prototype production type set of equipment.

DOOLING For Karol Bobko. Did I understand you correctly when you were talking about ascent that you had during the main engine burn you had a slight eyeballs-up feeling as well as eyeballs-back?

BOBKO Yes, the thrust vector of the engines. Yes, the thrust vector of the engine goes down towards the bottom of the vehicle so that you get pushed up in your seat and that's noticeable once you get above about 2g's.

DOOLING Okay. And also the dirt on the window comment that Commander Weitz made at booster separation. Did you really come back with a significantly larger amount of crud on the window or was it just lighting angle or whatever it seemed like more at the moment?

WEITZ Larger amount than we launched with?

DOOLING No, than was experience with previous crews.

WEITZ I don't know. We can't really compare it. I can't answer that question. There was a lot more than I expected.

DOOLING Okay, and finally for Story. Did I understand correctly you were standing up in the aft flight deck during landing and if so is that accepted procedure?

MUSGRAVE Through most of the entry I was standing up.

DOOLING That's not normal procedure though is it?

MUSGRAVE No, but we're evolving into an operational vehicle, in which it flies extremely smoothly, the outcome is totally predictable.

WEITZ As I mentioned before, one of the questions that we did want to answer was how reasonable, I think Don eluded to this before, was how reasonable is it in the event of an emergency or an off-nominal situation to send someone down, if you had to, to the middeck, for example to close the circuit breaker, or throw a switch. And this was our first insight into evaluating that, anyway.

DOOLING Okay, so this is something you agreed on beforehand and not something that Story did on the spur of the moment.

WEITZ No, it was something Story did on the spur of the moment. But no one said any quarrel with him, up to this point.

PETERSON No that we've pointed it out.

WEITZ We debriefed management up through and including General Abrahamson and Mr. Weeks this morning, and were straight forward on that. They know what happened, we showed them the same slide of the runway taken from the window.

DOOLING Thank you, no further from Marshall.

PAO Okay, we'll come back here to JSC, if we have any further question to wrap up, David Lee.

DAVID LEE (DISCOVER MAGAZINE) Back to the suits, would you tell us, give us some idea of how constraining they are, if at all, and how easy it was to handle the tools. For example could you do a backyard tune up job on my old jalopy wearing one of these suits?

PETERSON How long would you give me to work on it?

LEE As long as I take, which is several days.

PETERSON I think any tool that you use in the suit takes more time. Ideally, what I think what we ought to strive for in the future is tools that can be used one hand. That is, tools that don't require two hands to operate. For example, I used a set of vice grips on orbit, and you simply can't use a set of vice grips one hand, because you need one hand to hold them, and the other hand to make the adjustment. Once you get them clamped in place, you can start using them one hand. But I think unless you're going to provide foot restraints all over the vehicle so that the person can anchor himself, you need one hand to hold position with, and that says you have one hand remaining to work with the tool. And a lot of our tools are not, certainly optimized for one handed operation, and that's something we might look at in the future. On the other hand, what we have is a standard set of tools that I think almost anybody in this program is familiar with and knows how to use on the ground, and there's some trade-off in that. These tools didn't require any special design to amount to anything, and you can use them. We had a couple of cases on orbit this last time where I did things that I really had not spent any great amount of time practicing, and although it took a little more exertion and a little more time, it was certainly do-able. And I think that's about the best answer I can give you. It's hard to say that a particular tool is 70 percent more difficult in space, or in the suit, than it is on the ground. We haven't done that kind of evaluation, I don't think.

WEITZ I think a lot of it depends on the task you're trying to do with the tool. Given that the gloves are bulky and

cumbersome, it's kind of the best I can come with, is let's take a pair of snowmobile mittens, is probably a poor example for down here, but heavy gauntlets. But a screwdriver, for example, given a task you're trying to do in a cargo bay, may in fact not be a one handed tool. It just isn't you don't have the dexterity in order to use a screwdriver with that pressurized glove you do in shirt sleeves in your backyard. As a matter of fact, I would say for instance, pliers and screwdrivers which we think of as one handed tools, probably don't meet that classification for EVA applications.

LEE But as things stand now, do you feel you're capable of doing actual satellite maintenance and repair?

PETERSON I think you can, and I think that for two reasons. Number 1, I think we will learn better how to use the tools we have. And I also think that if we run into in the training and the development, a situation that requires special tool or a special technique, we'll develop the tool or the technique as we go along. I have every confidence that we won't send people out to do a job that they're not prepared to do.

LEE Just one last thing, P.J., could you describe for us the handling characteristics of Challenger as an airplane, and what would you compare them to, and were they different than Columbia?

WEITZ I've got no basis to compare it to Columbia, neither do any of the Columbia drivers have a basis to compare it too.

LEE How would you describe them, just...

WEITZ Solid, absolutely solid. I mean it's a good, tight, control system with a solid machine. It is so much, the STA is in the shuttle training aircraft is an invaluable training tool. As a matter of fact, in listening to some tapes of the landing, of the descent and landing is, one of my first comments after the wheels stopped on the runway, was that if you can do it in the STA, you can do it in the real world. Because the STA is an airplane of its own right, even though it's a flying simulator, it does respond in its own way to gusts in particular. And that's why I mentioned that when we flew through a gust is that that thing just chunged right through it and with no upset of the vehicle, you could feel it. But I just can't say too much about it, which is the same thing I've understood from the guys who flew the first five flights, and I don't remember about 101, what their particular evaluation of that was, but it's a good solid, tight vehicle.

PETERSON From a third seaters point of view, I was only standing up a couple of times during entry where I had to reach something, or wanted to reach something. But the vehicle felt more stable to me under a g and a half than it normally feels if

you stand up on an airliner. There was less motion, there was less turbulence, there was less vibration. It's essentially solid as rock, and I think Story stood up essentially all the way to the ground, and I think we're both confident that you wouldn't have any problem, even climbing down to the middeck and climbing back up if you wanted to do that.

WEITZ For those technical writers who may interested, I think that the initial, what I've heard, is that the quarter hertz oscillation, the lateral oscillation that occurs, where does that occur, around 2-1/2 to 4, somewhere in there. Anyway slightly in a supersonic range, was there, even though we did not sense it, as I understand I think no crew has, so far is what John says. And then we got, while we were prepared for it, we did get the transsonic buffet as we went through .95 mach down to, and it was gone by the time we came below .92.

PAO Okay, Paul Recer, you had a question.

RECER In General Abrahamson's April 9th news conference, he said that we would discuss SAS in a statistical way, is the way he put it. So I've got a statistical question. What percentage of the crew experienced SAS on this flight?

WEITZ It's got to be part of the general statistics, Paul, and I really think we have to put this into context and that's going to be handled by, we're urging the folks who are concerned with that from the medical aspect to put together a story on it, so it's not considered a bugaboo.

RECER Okay, well, you had some experiments on board in which you were exploring some elements of the SAS, did those experiments give you any insight?

WEITZ I don't know, frankly, is that they are relatively simple experiments, and we're primarily honchoed by Bill Thornton, who is in the astronaut office, and we did the protocol for him, which consisted mainly of some controlled head motions and some eyes-alone motion, and maybe Story, I don't know. Bill is trying to identify the causitive mechanism of this, and he keeps saying, boy, do we have good data now, and I don't know what that means, because I haven't had time to talk to him. But I think he's talking about what he's seeing and the difference between folks response in flight as opposed to what he's seeing on the preflight and postflight.

RECER Dr. Musgrave, did you get any insights from the experiments you ran?

MUSGRAVE Not so much the experiments, the experiments, that we have no way to look at the data. The experiments is to put the electrodes on and look at the relationship between head motion and being able to track single target with the eyes...

WEITZ It's not subjective at all, Paul.

MUSGRAVE It's looking at the relationship between head motion and eye motion and eyes tracking a static target or tracking a target that's attached to the thing. All that data went into the OPS recorders and was dumped down. So on board, there was no real data. If you're asking my technical opinion, I think the sensory conflict theory is, in my own mind, I favor that theory. In other words the organism senses that this is the down and then either visually or by some other mechanism, vestibular stimulation or any of the other sensory's, there's a conflict. There's a down and yet you look out the window and the Earth is down there and you relate to the Earth as being down, and there's that conflict. So technically, physiologically, that's the theory that I would favor.

RECER Is this a visual conflict, or a conflict caused by the visual perception?

MUSGRAVE From any of the sensors. You can have a visual perception, we train all the time with the bird in the horizontal position. We also go vertical with it, we spend more time in the horizontal position. And you get the feeling that the floor ought to be down and the ceiling be up. Or that the Earth is down or that you know, away from the Earth is up. And you have also bodily sensors, such as the vestibular system or what we call the appropriaceptive system. Even the cardiovascular system, you know, when you jump out of bed in the morn, you're lying like this, and you go up like this, you got lower blood pressure going to the head, you have a shift of fluid down into the legs. It's possible even the cardiovascular system makes inputs to the brain as to where is up and where is down or am I rotating or not. And that's, so technically that would be the theory that I favor.

PAO Carlos Byars, right here.

BYARS Paul, on some of the other missions at the conclusion of the mission the members of the crew have had some comments not too complimentary about various things where they were they felt they were surprised to find by the way various things worked. In one case the crew expressed surprise and distinct unhappiness that they had not been told about how insects were going to be mixed. They expected to find them in separate compartments and they were mixed and this created some unhappiness on the part of the crew. You've commented about having to break out, or Don had to break out a new tool, a pair of vice grips to work on something. What else about this particular mission has disturbed you in that fashion and is it possible that the crews are just getting a little bit picky.

WEITZ I think there's a lot to the latter theory. Frankly, we feel obligated as engineers and some folks still consider themselves test pilots, that you have to find some

things wrong and we did have some, what was that expression you used Carlos concerns or worries. I didn't have that. There were a couple of annoyances. One was along the very lines, and we've complained about it, but you know this is putting together and we have on shorter orders complicated mixes of things that are going in there not only major experiments but minor experiments that on the surface out of context you think that's minimal impact, we'll put it in. Well, then you get a surprise and as I mentioned before surprises take up some of you time and the best one was we had another experiment called, or the best example of an annoyance more of anything else to me was we had a Monodisperse Latex Reactor whatever that is but we call it the MLR and it needed some power sources. And you know, we had the information available to tell us that the experiment derived DC utility power from 2 sources in the orbiter and the rest of the world did too, but we weren't smart enought and the folks who were didn't think that it was an impact on training, but sure enough we got on orbit and of our 3 or 4 available outlets down in the mid deck 2 of them were already taken up the MLR. And that's an annoyance because we had gotten used to Don, I don't know what'd you plug in? The teleprinter?

PETERSON There's all, there's a variety of things that use DC power and in training we got in the habit of when you needed to hook one of those things up you went to the nearest DC utiltiy power outlet which is like a wall plug and if something was plugged in there you disconnected that and plugged in whatever you were using at the time. And you learn to do that over a year of training and you get on orbit and you find it's like, it's like going into your bedroom and wanting to plug in your reading lamp and you find your wife's got all the plugs full and not only that she doesn't want you to move anything. And that's bad enough, but if she didn't tell you not to move anything and you've already moved it then you really feel bad about it. And that's the kind of situation we were in. It's not a major, it's not a major problem or a major grievance it's just that you like to be aware of those things in advance primarily because you can, you can absolutely ruin somebody's experiment that he spent a year or 2 years or 5 years getting ready to fly by turning off the power to it when you shouldn't have and you're likely to do that if you don't understand that you just see this wire that trails off through the bulkhead and goes somewhere and maybe you don't even know that which experiment that wire goes to if you haven't trained for that and that's the kind of thing you want to avoid. It's not, it's not the fact that you mind taking the length of wire and finding another outlet it's that you're liable to make a mistake that costs you and the program and the people involved a lot of headaches.

WEITZ What we're up against there is our approach to the program where we are going to try to reduce the training time required to go fly a mission and therefore we're going to reduce the fidelity, really, and I think that that is a commendable goal I'm just not certain we're there yet. And until we put together,

you know, it takes time and it takes people in order to have 100% faithful replication in a simulator while you're training of what you're going to fly with especially if the same simulator in 4 uses in a row has to serve 4 different crews with 4 different configurations and I'm not sure that as long as we try to pare down on the training requirements to make the preparations for the flights from our standpoint cheaper is we're not going to come up against more of these surprises but the pitfall and Don put it very well it's not that it's there so much it's just the fact, the surprise, it's something new, it causes a little discussion, there goes 5 or 10 more minutes of time plus the risk of frankly screwing up an experiment as he put it that and you feel personally responsible when you do that.

MUSGRAVE Mission productivity is inversely related to the number of surprises. Almost by definition if you don't have surprises it means you stayed on the timeline, the mission got done what it was supposed to get done.

WEITZ And now we have to weigh that off against how much we want to pay to get 100% productivity.

MUSGRAVE The magic of this mission was there were very darn few surprises either vehicles experiment or anything else.

PAO Okay let's take one more here and then we'll knock it off. Van Hackett in the back here.

VAN HACKETT The news deparment has been bombarded by a number of questions in the media in Lexington, Kentucky for Story Musgrave. They want to know what the highlight of the mission was for you and what do you think its most important accomplishment was.

MUSGRAVE Delivering the IUS TDRS and the EVA, the space walk and electrophoresis experiment. I think those are some of my personal highlights and bringing the Challenger back in what everyone is saying is in fantastic shape and there should be a fairly rapid turnaround for that vehicle.

PAO All right. Thank you very much for coming and again we do have copies I hope of the status report, latest status report on the Tracking Data Relay Satellite out in the news rooms.

PAO Okay. Good afternoon and welcome to the STS-6 Post Flight Press Conference. I think you remember these guys and before we get started into that I'd like to say we do have a recent status report on the TDRS satellite. There are 2 pages to that and it will be available in the news room for you after the press conference and we also have a telephone number for the Goddard Space Flight Center where you can get regular updates and that's available also in the newsroom. Okay. I'll just introduce the crew. Commander Paul Weitz, to my immediate right, Karol Bobko, Story Musgrave and Don Peterson and without any further delay I'll go ahead and turn it over to Paul to pick up, give you a little status of what happened in the last couple weeks.

PAUL WEITZ What we'd like to do and it's, what is apparently the most nominal flight of the series so far which is very gratifying from everyone's standpoint is Bo will talk to you a little bit about the ascent. We have some slides to use as supportive material for our presentation such as it is. Don will talk about the IUS deploy. Story will cover the EVA activities and I'll talk about the entry a little bit. Then we'll show our quick-look film and following that then we'll have some time for questions and answers. So, over to you for ascent.

KAROL BOBKO As you probably know we went down to KSC one day earlier. We had the luxury of having a little time to do that and it gave us a little more flexibility in scheduling our aircraft flights down there. And as it turned out there was a front that was moving through KSC and that we did cancel one flight and went a little later with that one. I don't know if other crews will have that flexibility but it was nice for us. I won't go ahead, I won't try to describe every feeling that we had during ascent just some of the things that were a little bit different to us. First, perhaps because we had been preconditioned, the solid rocket boosters didn't have as much vibration and weren't quite as much of a shock when they lit as the other crews had indicated. We both, we all thought they were less than expected and we got off to a nice smooth ride. Of course the Earth goes down awfully fast. After about a minute into the flight we all heard a crack in the cabin. We certainly don't know exactly what it was but 3 days into the flight we found out that a bracket that was bonded on the wall of the cabin had come loose. That bracket held the CCTV monitors and that seems like the most likely suspect. I know my eyes got pretty wide when I heard the large crack and I'm sure everybody else's did as well. Then it settled down and at SRB separation the vehicle was engulfed in the fire which results from the separation rockets that push the SRB's away from the stack firing. We had all heard about them but it was still a surprise. There really is a lot of orange flame around the cockpit when that happens and it's really quite something. I think it was PJ that commented over the radio when he saw those

go. We did find that there were some deposits left on the windows [illegible] the SRB or by the sep motors. After the SRB's left us everything was smooth, quiet and steady just as the other crews have told us. A little later on when we got up to a higher g-level one of the things that surprised me was the fact that there was quite a bit of force forcing you out of the seat along with forcing you back into the seat. We went up to ET, we went up to MECO and things started happening quicker. Of course, you're gaining velocity at a great rate as you're approaching MECO when you're at 3 g's. But the shutdown was absolutely nominal and the 3 lights went out showing that the tank had departed from the vehicle. There was a little bit of a surprise. One of us must have touched the stick and downmoded from an automatic sequence and we didn't transition into the mode for firing the OMS engines as we had expected and the ground asked us to do so and we did so without any incident, but we were all looking over the side of the vehicle to see whether or not the tank in fact did go away. I saw an orange glow off to my side and I'm sure it wasn't the tank but I can't say what it was because what is there out there to glow I mean you have to glow off of something and I don't think there's anything there that is to be seen. Once the OMS engines ignited they were rock solid. Of course, after the SRB thrust and after the main engine thrust the little OMS engines, or what seemed to be little OMS engines at that time, weren't much of anything. You hardly noticed the thrust. Then we settled down to wait the time between OMS-1 and OMS-2 and, unlike the simulations, we didn't have a whole line of emergencies that they had injected during the ascent and so we had a very leisurely time and [illegible], could get ready for the OMS-2 and Don and Story started to get out of there seats and we started to get ready for our onorbit activities. The OMS-2 was, we were ready for it. It was relaxed. The engines could be felt but again they didn't seem very large and then we went from there into the post insertion which also was very nominal. The door opening was a bit of a surprise in that they operated much smoother than everybody else had narrated their experiences to us. The doors had no jerkiness. They just opened beautifully and smooth and they closed later on in the mission in the same manner. From the liftoff until we got through the post insertion, it was on time. Just about everything was nominal, a few small exceptions like the large crack I mentioned and we were ready to get started on the IUS checkout and deployment.

WEITZ The large crack being a noise.

BOBKO Right. Not a crack in any structure.

WEITZ Bo is very kind. The one of us who must have hit the hand controller was me. We haven't gotten very good photos so far for the tank folks on ET SEP. They'd like to see the front end of the tank so I told them that as soon as we got into OPS 104, which is a post ET SEP mode of the general purpose computers, I would thrust forward to try to get that coverage of the tank. I don't remember doing it but I was the only one who

could have because it took the translation hand controller to do it but in my, apparently, in my haste to get in position in order to give them the good pictures of the tank I interrupted the sequence and therefore didn't get them any good pictures of the tank. So I've appologized publicly to those folks. It was a procedural error and in no way requires any change on my part nor will it require any change to any hardware or onboard procedures. Don, do you want to pick up and talk about the IUS deploy?

DON PETERSON Okay. What I'm going to do is show you a few pictures that we made out the back window to give you some idea what the sequence looked like and before I start doing that I want to tell you that we're going to address the IUS/TDRS deployment only up through the time that it essentially departed the orbiter for a couple of reasons. Number 1, that's essentially where the crew and the orbiter's support for the payload ends and also where we lose most of our data and command and control capability. Also, of course, some things happened to it later that we frankly haven't had time to become really familiar with. I think we were surprised by that because in the course of our 10 hours or so on orbit before the time we deployed it we had seen less than, well, let's see, about a half a dozen minor anomalies none of which we thought in anyway affected the capability of the IUS and TDRS to do their job and when we deployed it as far as we were concerned it had a clean bill of health and we were delighted with it. Let me jump into the first slide. Okay. This is what it looks like out the back window and I guess the couple things I ought to point out. Number 1 up in the left inside is a ghost image. You'll see that in a lot of the photography because the panes of the windows on the orbiter are, it's like the window has 3 panes of glass. It's 3 panes thick and what you get is a reflection between or amongst the panes of glass and you see that kind of ghost image on a lot of things. The main points to look at here are first of all the size. This payload's 46, 45-46 feet long. It occupies most of, of course, the 65 foot bay and it's stowed aft so that you have some open area up in front. Another point you might notice is the little drum shaped things along the side here. Those are the canisters that house the Getaway Special and we'll try to talk about those later perhaps. This is the way we first saw the thing when we got to orbit. It's latched down at the front and it's in a tilt table mechanism at the back. Go to the next slide. This is the elevation at 29 degrees. We essentially released the front latches, which you cant' see very well, but there in this dark area right here, on each side, drive the aft tilt table up to 29 degrees, we stopped there for a couple of reasons, number 1, we have an umbilical that supplies power to the payload, and you can't see it very clearly in this picture, you'll see it better later on. And if we go higher than that we have to disconnect that umbilical and we want to keep the IUS TDRS on orbiter power until we're through checking it out, so we keep the umbilical attached at 29. The reason for elevating it all is that we need to get the antennas up out of the payload bay so that we can check them out. In doing all of this, and I guess

we could go now to the next picture which shows that at the next stage of elevation, this is at 58 degrees. And now if you look closely, that's the umbilical attachment right here as disconnected from the orbiter, or disconnected from the IUS TDRS, rather. In all of these operations, I think we were impressed by a couple of things. Number one, the checkouts went very smoothly, the communication with the satellite was very smooth. There are a lot of motor operations to drive latches, and drive the tilt table, and in every case they operated faster than the check list required them to, and the motions were extremely smooth. We never felt or saw any evidence of any kind of vibration or ratcheting or any other kind of uneven motion, it was just a very very smooth operation. Let's look at the next slide. This is a much clearer picture that shows, this is the umbilical it took to the orbiter that brings orbiter power to the payload. It normally hooks up in this area, and you can see very clearly that is detached. In the course of this elevation, we obviously watched the thing visually out the back window. We also have cameras mounted at the four corners of the payload bay, and the two in the aft corner, there's one there, there's one over on this side. We use one of those to look at what looks like a protractor scale, it's mounted on the tilt table, allows you to read the exact angle of the tilting, and I think later on in the movie, you'll see that. We were able to tell exactly what angle we were at and everything proceeded very, very smoothly. As we came down across Hawaii in the last pass prior to deployment, the ground had done their checks, they gave us the go for deploy. We checked everything on board and it all looked good to us, and we deployed. Next slide. I guess this is the, for Story and I at least, this is one of the highlights of the mission. You can see that the satellite has essentially cleared this mounting structure in the back there, and it's starting to move out on its own. And another thing that we noted here was that when this event occurred, I guess we expected some reaction in the orbiter, we expected the orbiter to rotate a bit, we expected to feel something or hear something, and it was absolutely quiet and absolutely motionless. We didn't get any kind of vibration or impact or any indication, except visual that this was happening. And as a matter of fact, Story had punched the button to release it, and for a split second I wasn't sure anything had happened. And except for that camera right there looking at this NOSL when it was down below there and seeing it move, I wasn't really sure we were deploying. And that's how smoothly it went. We, of course, continued to watch it as it deployed and the motion of the satellite combined with the motion of the orbiter carried it first up over the overhead windows and then down in front of us for a while, we watched it out the front windows and finally as we maneuvered for our burn it went off to the right side a bit, we watched it out the side window. We had visual and photographic contact with it for a long time. And I guess the most spectacular part of the deployment, next slide please, was when it hit the sunlight. That's a ghost image in the window. This is what the thing looked like when it first went into sunlight. We were, the orbiter was still in darkness as we

came across the terminator, and it lit up literally like a magnesium flare, so bright that you could hardly look at it. We had our cameras set for shooting at in daylight, but I guess we really didn't have them set properly for that much light. But we got a couple of pictures and it was really spectacular. As I said before, I can't really discuss post deployment, and I don't think I should try here. But at the point that we released it, we felt so good, Story and I were rummaging around for the mission whiskey.

MUSGRAVE I'll discuss the extravehicle activity or the spacewalk. The thing we wanted to test and evaluate there was our ability to do construction type work repair type work in the environment of the Shuttle orbiter. We wanted to checkout our suits and the life support systems on the back that we call EMUs. We wanted to evaluate how we checked them out before we take them into the airlock and depress and take them outside. We did have three suits onboard. We wanted to look at our ability to move about in the payload bay, up and down the longerons, or up and down the long distance of the payload bay, and of course the bulkheads, fore and aft. We wanted to look at our safety tether dynamics, the safety tether we wear to be sure that we stay connected to the orbiter. We wanted to exercise various tools, winches. And, in summary, our basic ability to do work, constructive type work, or repair type work in the environment of the orbiter. Now the suits, or EMUs, performed extraordinarily well, all the checkout we did. And after flight 5, as you remember, we added on some additional checks to be absolutely sure, some very aggressive checks of all the suits to be sure that they would operate long before we decided to commit ourselves to the spacewalk, tney all checked out extremely well. We wanted to exercise the airlock operation of depressurizing the airlock and getting outside. That went extraordinarily well. And the EVA accomplished all the objectives that we set out to do. We stayed on the timeline, the total EVA took about, right almost to the minute that amount of time that we thought it would. And we can get the lights down and go to the first slide, please. These slides will demonstrate as samples, sample data, some of the things that we exercised. Here Don Peterson there traversing the payload bay. You can see the handholds here, one hand on the handholds, and the other hand on the slide wire. We exercised translations, up and down the payload bay. We also exercised translations across handholds, which you can't see particularly well there. In this particular slide, I am routing a winch rope from a winch here, across here, and connecting it to, this is called airborne support equipment, that's where the payload rested. In case we were unable to stow that by the normal means, we were exercising a contingency task here to see that we could route a rope, put tension on the rope with the winch, and the next slide, please, and just exercise that typical task. Here you can see a bunch of tethers, this is slightly confusing slide, but if you look at everything that you can see in this slide, as being away from you. That's the far bulkhead, the far wall of the payload bay, except for this one

slidewire here. So this slidewire is really on the bulkhead or on the wall of the payload bay that is near to you. All of the rest of the structure that you can see is that part of the bay away from you. And I'm hanging out here between the two walls, I'm in the middle here and I'm exercising tether dynamics. You can see my safety tether right here. There's a reel and a cable that goes over to a slide wire that runs up and down in the payload bay. So that reel will reel in and out as I move a further distance away this slidewire, and the slide mechanism here allows that to slide up and down. So as I move up and down in the bay, a slide will move up and down with me. And as I go away from that slidewire, this reel here will reel in and out. Part of the tether dynamics was to study the dynamics of that safety reel, and also to study if you ever got off of the handhold where you were free floating, the dynamics as I am here, of grabbing the tether, I have a second tether, so I have total control. My safety tether here and another tether here. I added on this second one so I could study the dynamics of grabbing a tether orienting my body only by using these tethers and then pulling myself back toward a tether point. You can see parts of the suit structure in here, we evaluated the suit mobility. How far you can reach, how far you could exercise all the joints, such as the knee joints here, the hip joints we have here, and the various bearings. There's bearings in the thigh here, there's bearings in the shoulder, bearings in the arm. We exercised all of those things to establish in O-gravity what the mobility, reach and stability is. Next slide please. You can see various components of the suit here. Here's the helmet of course, on the helmet are mounted lights here, there's the button for turning the lights on, there's actually four lights, two on either side. We evaluated the lighting, in both sunlight, in night we evaluated the payload bay lights of the orbiter, and also, these lights were extremely effective. Here's the backpack here, the backpack provides the oxygen, which pressurizes the suit, it has lithium hydroxide in it, which absorbs the carbon dioxide from metabolism.

It's also has a sublimator which evaporates water and that's the way we achieve our cooling. So the life support system that we use for cooling, for providing of oxygen, taking out the carbon dioxide is all in the backpack here. This is the display and control module here that we run, our extravehicular mobility unit. All the switches and the light emitting diode here to tell us what the status of our suit, the status of our life support system is read right here. You can see a work station, a mini work station in which we tether ourselves or tether tools, it is in this vicinity here. Here's the slidewire and here's the slider here which slides fore and aft, up along the payload bay as I mentioned before. The next slide please. Here's another task we looked at it, and that is transferring what we called a massive article. This is a bunch of centerline latch tools that we use if we ever had to latch up the centerline of the payload bay doors manually because we're unable to do them in the usual fashion, we have several tools in here. But for this demonstration, it just provided a very heavy article that we

could practice maneuvering around in the payload bay. And the lights, please. In summary, we had a very aggressive DTO to prove that we could take the Shuttle suits out into the payload bay, study how they perform. They performed extraordinarily well, we demonstrated that we can do constructive and contingency repair type work in the orbiter.

WEITZ We just got a few incidental photos that we can talk about next if we can have the next slide, please. We wound up with some objects that would disappear or change location, books, film, cue cards. And this green-eyed critter in the suit here is the guy we feel must have been responsible for it. Next slide. These are the loose pieces of insulation back on the OMS pod that we discussed. Some folks got the impression we were concerned about the fact the pods, the insulation was loose, that was not the case. I was not convinced that they were going to survive reentry in that condition, so I just wanted the folks on the ground to get as good a look at it as we could give them in the event they weren't there when we got back to possibly give a little insight into the failure mode. But you can see the two pieces that are projecting up from the top side of the OMS pod, and there's another, Bo, you can put it down on that rope, there's a piece of insulating, it looks like a piece of clothesline, about 8 or 9 inches long, it's protruding out from underneath a section of the blanket. That's the portion of the blanket that isn't there anymore, so I suspect that that rope is long gone also. Next slide is something we never got tired of looking at, this is a fairly good photo of a sunset or a sunrise, they look the same, you run it forward one time, and it runs in reverse in the other time. But we never, I think most of us never got tired of looking at this. Next slide is the lightning experiment, and I'll turn that over to Bo, who was the prinicipal data gather for those folks.

BOBKO We simply had a 16mm camera and made comments into a tape about lightning that we observed, and we took I think 5 or 6 magazines of storms that night. A couple of the storms were over the Gulf coast during the day. We haven't heard any of the results but they do make rather nice photographs. Next slide, please. The Ganges River delta was clear as we flew over. And we have a number of pictures to form film strips taken a number of times. We were told that people were interested in that to see how the delta is changing as time goes by.

WEITZ The significance of that is that we've been trying to get decent picture of Gangees River Delta for quite a while from our manned flights anyway. And it has been unsuccessful so far, usually do the cloud cover, and this was one time, for a period of days, that it was relatively cloud free.

BOBKO However just east of this area is the area just east of the Himalayas, and we try and get pictures of that, but it was always cloud cover when we were passing over. This is Katar and Bahrein, and the oil spill that has occured in the

Persian Gulf is coming down from this direction. And as we understand it, gumming up some of the desalination plants that provide fresh water, and so we were asked to try to get pictures of that area, which we did. We didn't think that the pictures came out very well, because there was some high cloud cover, but they seem to reasonably well. Some of the people that have looked at them say yes, they have been able to see some of the oil, but I'm afraid that I can't point it out to you without having some doubts in my own mind that I'm absolutely correct. Next slide please. This was in Gulf of Oman near the Persian Gulf, and you can see tankers that are sitting offshore waiting for cargos. The surprising thing was you could see them with the naked eye, you know you can usually see ships wakes or contrails, P.J. looks for ship wakes, I look for contrails. But we were surprised that this one took a photo. Next slide please. This is a picture of some of the Macran Mountains, which are the mountains in Iran and Pakistan, going on into India. And it's a place where continents are in collision, and they have folded the Earth, and these mountains have resulted, and there's some rather spectacular swirls in the Earth's crust and mountains which resulted from this collision. The next slide please. This is the junction of the White and Blue Nile in the Sudan and Kartoum, it's up in this area. And these are the cotton fields, where they grow the long staple cotton. It's surprising how much you can see from orbit. And, as you all realize, the pictures never quite do the scene justice, it's always better to look at it with your naked eye. Next slide please. This was a dust storm in Mexico, and it's in northern Mexico, I understand in the state of Chihuahua and the United States is up in the background. But that was interesting and it was surprising how much of the Earth's surface the storm covered. Next slide please. I just took this picture because it was pretty, but there was a low sun angle and good shadows, and the shadows really defined the extent of these thunderstorms. It was taken probably over Africa. However, there is enough haze underneath in the atmosphere, that's very difficult to make out exactly where we are. We have two of these, so it makes a stereo pair. I haven't looked at them in stereo, but I understand they really stand out in stereo viewing. Next slide, please. And we took a number shots leaving Florida over the Bahamas and this is one of those beautiful islands, Eluthra, that's worse than the Moon. But you can see how the wind has caused a band of clouds and you can see the island itself and the deeper water and the underwater relief is clearly visible. And again, it's ashame we can't really show you what it looked like because it was even more beautiful in the photographs. Okay, can we have the lights please.

WEITZ I cannot say, from my own personal standpoint, how pleased I was with the performance of this vehicle. I knew the crew would perform. I had some reservations about the vehicle, frankly, not because of any specific indication or any particular item. I just thought that you know you have shakedown cruises for ships. Boeing when they built their 1500th or 2500th 727 before they shut the line down. They fly it with a minimum crew

on a checkout flight just to make sure everything works right. Frankly I was, in my own mind, mentally prepared, I didn't tell my friends and cohorts that, but I was mentally prepared to suffer the disappointment of coming back after 2 or 3 days due to systems funnies, malfunctions, malperformance, whatever you want to call it. And I just can't say too much about this vehicle which demonstrates to me the maturity of the entire Shuttle Program, the Shuttle Transportation System. We can obviously build vehicles better, we know how to test and check them out. It costs us some time, some schedule time in this particular case but I think that hindsight we can now say that it definitely was worth it. It also shows the maturity of our operating procedures. Our little bit of required contact with the ground just went super smooth. They were on top of everything but again that's because we had such super smooth vehicle. I'm sure you're aware of the significant anomalies. We had an av bay fan, an avionics bay fan that gave indications of clogged flow although another fan in that same bay performed nominally. We had a short circuit on a humidity separator on flight day 1. That was protected by circuit breakers. They opened and protected the vehicle and the electrical system and we got by on our redundant humidity separator for the rest of the flight. We had a couple of other funnies including pressure control system demonstrate some anomalies. We think we understand those. We know how to cope with that. We had on the last night of the flight our most significant failure which was a failure of the general purpose computer number 2 which just took off, headed south and departed for parts unknown on its own for a reason that still is not fully understood because, as I'm sure you're aware, we powered it back up, brought it into what we call a redundant set the next day to do its thing with the ground having taken the appropriate precautions to not give it any critical functions to perform in the, what we call the string assignments, that is, the functions that are performed to the various computers which we can juggle around. But it stayed in all the way from the time we brought it up the morning of entry day until the GPC's were powered down. Yes it hung right in there and did its right thing so we don't really understand what happened there. Probably it was a computer hardware problem but that is not fully understood or appreciated at this time. Anything I overlooked on that? It was a comfortable vehicle. We think the temperature control was a little better on this than it is on 102. We kept setting the manual temperature controller to a warmer and warmer setting as we went on. The STS-5 crew had complained about how hot they got in the cabin during entry so we made sure when we got up on entry day that we went to full cold on the temperature controller and that that, shortly after that we started adding layers of clothing and you can see in the movies when we got out of the thing on the runway we got extra shirts on and it really does a good job. You'd rather by far be a little on the chilly side than be too hot.

BOBKO I was just going to expand a little about the GPC. We had the failure and we did our checklist procedures. We knew

that there was a ground station pass coming up in about 5 minutes. The ground station pass was 6 minutes long, I think, 6 minutes long. They must have been very surprised as we were very surprised when the GPC went down and before the end of that 6 minute pass we knew exactly what we were going to do and had a plan set out for the night. We did 2 more, we did a dump of the GPC memory, of the failed GPC, and essentially went to bed with them looking at that information. So it was, I thought, handled in a superb fashion and we were all very comfortable with what happened and really pleased with the tremendous response we got from the ground. In a few minutes we had it all taken care of and when we got up the next morning we tried it and it worked. And it worked all the way through entry.

WEITZ Yeah. We were already about an hour into our sleep period of the last night and I could just see it while Bo and I had already gone through the malfunction procedures for GPC failure in that situation and were waiting to consult with the ground. And I was mumbling at least to myself if not out loud about here we go we're going to spend 2 or 3 hours playing with this damn machine trying to get it to work right and trying to figure out how it failed and it's not the way it turned out. I cannot say too much about in that short a period of time, in a period of 4 minutes, from the we hit them with the news of what happened until they totally put together a, the control center put together a plan and put it into effect. In that 6 minutes they said, okay, good night, we'll see you in the morning. And that was a very pleasant surprise. Well we arose on time on entry day, and again, everything went per the checklist on time. The deorbit burn was smooth as advertised. We did notice one thing. We're going to recommend a change in procedures is that we have once we get out of OPS-1 which is the launch, the ascent operational mode of the computer software we have what's called the hot stick downmode capability in which case if you're flying on the autopilot I can knock down the autopilot and fly manually just by moving the controller, the hand controller out of detente. And we must have inadvertently bumped the stick between us the two of us at least 5 or 6 times, I would guess, while we're sitting waiting for it was mainly post deorbit burn while we're sitting waiting for EI.

BOBKO One of the surprising things or one of the things that happens is when you're in 0 g your arms naturally go to a position about like that.

WEITZ And your body tends to straighten out to you're ride higher in the seat then you sit in 1 g.

BOBKO And your hands are out in front of you. I know perhaps one of the first indications I had that we really had started to pick up g's after we had come back into the atmosphere was I looked down and found that my hands were in my lap. I mean they weren't up here like this you know and I think it just makes it a lot easier to bump the stick when your hands are in a kind of an

unaccustomed place.

WEITZ Yea, well I think if I was bumping it, it was with my leg so but anyway we removed power from the hand controllers and that fixed it. We had it on the fly and note to our entry checklist at the appropriate time to turn the hand controller powers back on, the flight controller powers, and that took care of it. Deorbit burn was good. Golly, it was just such a smooth ride all the way down I don't know what to say except that just before we came into sunrise we could start to see the ion sheath out over our nose, Bo and I could. The thing that surprised me was that even after we came into full sunlight, and Don reminds me of what is going on from a physics standpoint and he's correct but nevertheless it still surprised me, is that even in bright daylight I could see one time for example, I forget whether it was in the first bank or the second, after the second reversal, I forget which now, but the vehicle is in full bright sunlight but in the shadow of the orbiter I could still see the pink glow of the ion sheath and it just surprised me and it's kind of a gee whiz thing to see and I wish we'd all have the opportunity to see what STS-5 did when they made, when they encountered the atmosphere in darkness. G onset was gradual. Subjectively, it felt like on the order of 40 to 50% more g's then we actually were pulling. We saw the California coast as we came up on it at about mach 5. You can feel, you know when you're coming in a 40 degrees angle the attack even though and you're slowing down, you're starting to take energy out of the vehicle but the acceleration vector is essentially upward so you're pressed down into your seat. As we got slower, as I'm sure most of you are aware, we decreased the angle of attack, pitch over more, and as you approach mach 4 to 5, in that region there, you know that you are really slowing down. You can just feel the acceleration vector go from essentially straight down. You can feel it starting to move forward and as you do you are just pulling forward in your seat. And again, that all makes sense but it just surprised me a little bit. After the fact, it doesn't but at the time it was kind of a gee whiz thing. We did our last reversal, a turn from a left bank to a right bank. Bo said he saw Edwards, west, south, southern California was absolutely wide open. We were on the groundtrack. Everything looked good on our displays onboard. It was verified by the ground. We headed on in at, autopilot turned us on to the heading alignment circles cylinder cone, whatever it is now, the heading alignment C and once we got established on the HAC as it's called I went to CSS, flew it around manually. We were going because of the relatively strong headwinds to what's called a close in aim point. As we're on the 19 degree glide slope nominally for low wind or no wind you aim your velocity vector at a point that's 7500 feet from the threshold of the runway. Just to get us a little pad we also have in the guidance and used to when Edwards was still a dry lakebed before it became a seaside resort, have a triangle or a rectangle or whatever, was painted at 6500 feet. Well, that's been wiped out by the waters out there.And when we came off the HAC and I looked throughout through the HUD, I had been looking

outside the window up till that point and it just surprised me because the HUD runway was overlayed as near as I could tell, precisely on the real world runway. But the aim point didn't seemed to be in the right place. Well the HUD gets its inputs from guidance and it ought to know where we we're going, so that precipitated a conversation between Bo and I as to where guidance was taking us. And it turned out that he had total confidence, I wasn't sure and he was right. So it was taking it to the right place, but that is the, it's the little things that kind of cause you to depart from your planned sequence of events, that was the time at which I had intended to return control of the vehicle back to the auto system so that the flight control folks could get some time in auto on the outer glideslope and frankly I just forgot about it while I was flying it manually, while we were talking about where we were going. The HUD was a tremendous asset, I feel, toward making that subjectively from an operator's point of view, I thought was a relatively smooth approach and landing. And the HUD really helped a lot. It, in conjunction with what you're seeing on the outside world, you still crosscheck inside. Don Peterson, both on ascent and entry is sitting, you know I sit on the left side, and Bo on the right and Don sits behind the center console in the middle, and it's his job to keep us out of trouble, which he did obviously a very good job of. But once we get below about 5000 feet, as Don starts feeding me, just in case, well both of us, in the event that Bo would have to take over, information over the intercom loop on altitude, airspeed, and you put this all together, but the HUD still helped, it helps a lot. So we got good indications on the HUD, the things were set up. We felt a little turbulence, one gust on final, on the final approach that my impression was that a gust came along and said, I'm going to get you, orbiter, and the orbiter just went in one side and out the other, and said you know, take that, you can't do much, because you know it's a 95 ton machine that's moving down there at a significant number of miles an hour and it just sailed right through it with no crew response necessary. The touchdown was nominal from my standpoint anyway, relatively smooth, and derotation, I didn't sense any drift until we got the nose on the runway, at which time I then sensed a little drift to the right, but it was not remarkable or alarming from my standpoint, I didn't hear any gasps, so you guys might have been holding your breath or something. But I think we did give the brake and tire folks a reasonably good shot at their DTO, their Detailed Test Objective. You may know, we have had some mixed and not very good results from the brakes. Unfortunately we have not had a chance to talk to the brakes folks, but from an operators point of view, is you couldn't have asked for anything more. There was not pull off of the brakes one way or the other. I applied max braking from 140 knots ground speed down to 90 knots and moderate braking after that. And during the moderate braking phase, then used differential braking to steer us back to the centerline, because we had to look good for the post flight photos to have the orbiter near the centerline anyway, and that all worked well. Also the, since everything was relatively nominal, the communications was,

control center were good. I think we got the vehicle ready for, to tow away in a new record time, and that doesn't say anything about us in particular, again it's just because the maturity of the program. Yes, if we could have, what I'll do, we got one more slide, if we can show the slide and then from that we'll go into the movie. That's what it looked like out the window, the question has been asked about what it is reasonable to expect in the event that an emergency should arise, what you can ask a mission specialist, or anyone in the back end to do and Story was standing up when he took this picture out over Bo's shoulder, and as a matter of fact, Story was on his feet through most of the entry. And I don't know what our max-g loading got to, I suspect we didn't have much wind at altitude, I'd be surprised if it got over a g and 1/2, 1.6 g, in there somewhere, so you can see it was a good clear day. The more yellow part at the bottom part of the window there is where the water is still laying on the lake bed. So when we can, if we can cut the slide and go to the movie. This is the ascent, liftoff, for those of you who weren't fortunate enough to be there, very fortunate from our standpoint, but I understand from the folks on the ground, it was one of the clearer days we've every had in Florida. When the solids get a hold of you right here, you know you're going where those solids want to go, and you hope that something keeps them pointed in the right direction, because you're on your way. The roll, as reported before, was not disconcerting or confusing in anyway. You know that's about a 90 degree roll there as soon as you clear the pad. As Bo said, we were kind of prepared for more shaking and clattering and vibration than we actually had.

BOBKO It's interesting to look at it from this prospective.

WEITZ We're approaching SRB SEP here. You can see tail-off. There are SEP motors and as I say, those cause it to fall away in the right direction at the right rate, and those are what subjectively I feel deposited the most gunk on the windows. As Don pointed out to you before, this is another view of the Tracking and Data Relay Satellite in the bay. This is since we were elevating it from the stowed position to the 29 degree checkout position. It moved, phase I used earlier in the, with management today, was that thing just moved majestically, it is quietly, silently, as a matter of fact, and almost inexerably, goes about its thing. This is as it was moving up toward the final attitude, 45 degrees, you can see on our protractor that Don had mentioned previously, was our minimum elevation angle, once it got to 45, if everything else was okay, that thing was going, whether we got to 58 or not. Now that's the nozzle of the solid rocket motor, and this is the instant of separation. As Don said, we really had to kind of check the television view from this aspect to see that it was in fact, had deployed. Absolutely perfect deployment, mechanically it came straight out of the ASE, the airborne support equipment, with no rates, just that again at it's 4/10 of a foot a second, which isn't all that fast. And now at about a minute after deploy, as we thrust backward toward it,

and you're not sure the thing is really clear of the orbiter, but that does cause you to pitch down also, or away from the thing. But it never lets it gets its attention when you're thrusting back toward a 17 or 18-ton piece of metal in the sky. The white part is the IUS, the Inertial Upper Stage. Here's where we started to thrust toward it and pitch down. This was later on flight day 3, I guess, whatever it was. This is the FCS flight control system checkout, we do it every flight on the vehicle. And that is Story operating the camera to take data for the Continuous Flow Electrophoresis System experiment. This is the one that's a joint venture between McDonnell Douglas and Johnson and Johnson, which they have every confidence is going to have direct earthborne aplication very shortly. He was taking some photos of the streams up there and down here, he's getting ready to changeout some samples. Don was basically, he was the housekeeper, and you can see that he kept a nice, neat ship down here. Not a lot of trash and equipment and items hanging on the lockers and on the bulkhead and that really helped a lot. And this was flight day 2 here while Bo was telling the world about the getaway specials. As Don mentioned previously, they were mounted in those three canisters. We did an antenna test which necessitated us getting crossways to our velocity vector and then rolling at 2 degress a second. We took some pictures of it and I'll tell you it was a little more impressive from onboard than it is here. But nevertheless, it was a welcome diversion from just going around the world with the payload bay facing the earth all the time. This is on EVA day that's Story and Don in the airlock beginning their prebreathe. You know requires 3 and a half hours of prebreathe on 100% oxygen to make sure or to have better assurances that we've flushed nitrogen out of the system so folks don't get the bends when they're exposed to the lower pressures in the suit. Bo was cleaning up the airlock and making sure that everything was ready for them. This photo was taken through a, no this is from the aft TV cameras. That's the airlock hatch being opened in preparation for airlock egress. And this is Story. Okay, a butterfly coming out of its crysallis I guess except he ain't near as pretty. But he has to come out and hook up the safety tether which he mentioned before and these are some translations I guess, is that you Story, going back along the starboard handrail, along the starboard lounger on toward the aft end of the vehicle. And these are both folks, Story in the foreground was moving back and Don was preparing some equipment up at the forward end. You see the two windows up there in the aft bulkhead through which Bo and I were able to keep tabs on what was going on. We were in constant radio communications with the two EVA crewmen as they were with each other. So we had a duplex com loop set up there and the ground when we were over ground stations could talk to any and all of us also. Don here is back at the IUS tilt table. This is in the aft end. He's using a ratchet wrench here to reposition some equipment. Story mentioned before their practice run through of the IUS tilt table restow mechanism for which we have an EVA procedure. That's just kind of a gee whiz thing. I tell you, this thing really does have a Star Wars effect. 65 feet is a

long way back and that's a big vehicle and it still surprises you. You look back, you're in orbit, you're in a spacecraft and the damn thing's got wings and a tail. I just seems innocuous and when those guys were in the back end of the vehicle they were far enough away and everything just absolutely silent. You know you're gliding over the earth due to some fortunate magic and they're back there having a heck of a good time in this case and it really does have, it's more Star Warsy than Star Wars I think. Except Star War spaceships have wings also. This is as we were going down. We were fortunate here. That's the west coast of Mexico just below Guadalajara where it kind of bends from the southeast to the east southeast so we were zinging right along the Mexican coast which has no significance except I think it makes for a nicer looking picture than if you had nothing down there. You notice on the fin the rudder is offset to the left a little bit up there. That kind of surprised me. It turns out in talking to folks afterward that the flight control system checkout leaves the rudder parked to the left and it's nothing to be concerned about. That's just what it does. Now those were all daylight scenes. Here are some with, the film compensates for the lack of overall illumination in the cargo bay. I think Story mentioned that the helmet mounted lights were for all practical purposes essential and that the payload bay flood lighting was not adequate to do your task. So here he's using the EVA winch that is utilized for several different tasks. This is on the forward bulkhead and it's routed down to, he just pointed to an exergenie down there which is used only to provide a load on the, on the line that we use. Here we're doing some suit mobility checks, kind of reach envelop determinations, suit stability and mobility evaluations. Seeing if there were any objectionable lockups in the, in any of the bearings. See if you could put it in one position where you wanted it, keep it there, so-called neutral point. Performance of the EMU's was just like the performance of the vehicle. There was, we've had some bad starts but they all, they both worked like champs in this particular evolution. And we're very gratified by that also. This is getting back into the airlock. Turns out we have a little work to do on, the term Story used as choreographing this evolution and that's a very good term I think is that, as far as our procedures for getting out of and into the airlock. This is on the last day of the flight when we had our impromptu conversation with the Vice President. We decided, we were notified during the flight that we had the dubious distinction of being the, in average age the oldest crew to ever fly anytime, anywhere. But these were taken from the TV photo chase on return to Edwards. You can see the weather was as good out there for entry as it was at, in Florida for the launch. This is through the HUD, through the head up display. This is a third or fourth order conversion of this and I'm sorry it just doesn't show up as well as it does on the original. You can see that those green symbology, the green symbology is displayed on the HUD. Here we are in the flare. Preparation for landing. This almost counts as a carrier landing as you'll see in the next photo by an over water approach here. (Laughter)

PETERSON Edward's dry lake bed.

WEITZ Right, the former, Edwards, former dry lake bed. Speed brakes are starting open. Our standard procedure as soon as the main gear are ondeck I call speed brakes open and Bo manually opens the speed brakes to help impart some drag to it. Some folks out there by the side of the runway said they could see a little bit of smoke coming off the tires during the max braking part of the test but I only heard that from one folk I think. I don't know if that was actually so or not. But anyway, it's starting to come together, folks. The whole system is, I think we're on our way. It did feel good to be back on the ground again even though it was a tremendously exhilarating experience. But that is just such a huge, impressive vehicle especially when it's sitting on the ground. Our postflight walk around such as we were permitted to do. We couldn't get around the aft end of the vehicle because of the, they were making sure that the propellants for the OMS and RCS were all secured. But it looked in, in just absolutely super shape and I don't know, what is the last count on tiles that have to be replaced? I think it's like just 30? Something like that. I mean obviously there's a concern where that new insulation on the OMS pod was severely eroded on the forward edge, leading edge of the pods and obviously as you can see from the onorbit stuff is it, they were fine when we started the deorbit. So it happened sometime during entry and we don't really, as best I know we don't really know when. Anything else before we throw it open to the floor. You guys want to add to that?

PETERSON I would say one thing that, that the quality of the film, I think doesn't show the quality that we observed in the master copies of some of this stuff, but some of the master copies are really sharp and clear of some of the VTR sequences

PAO Okay, we'll go to questions here at JSC, and if I don't call on you by name, please state your name and your affiliation and wait for the mike to come around to you. Do we have questions? Olive Tally.

OLIVE TALLY (UPI) P.J. and Bo have both alluded to how they felt about it and you described it a little bit, but I would like Story and Don please, to sort of share with us please some of your emotions that you felt when you walked out, or however you got out of that hatch, and what you felt as you are hanging out off the side of the orbiter.

WEITZ Before they start, let me say one thing, the week before the flight, Don came in with request to our flight control teams, that he said, doggone it, while he was out in the cargo bay, he didn't want to just look at the Earth we've been looking at for three days, he wanted to see some of the stars. So they were kind enough to oblige us on that, so on one pass there, we just went to inertial attitude hold at local noon, and that kept

us in the same attitude inertially, so as we got to the other side, the dark side of the Earth, our cargo bay was facing toward the sky. And they gave us a better view, I think it made for some better pictures, a little gee whizzy, it wasn't necessary for the test, but I think it gave Bo and I a little better view, while these guys were conducting in their perfect EVA.

MUSGRAVE I think that change of attitude would certainly encourage some different kinds of feelings, or different perspective of the universe, and of the Earth. I was looking for some, I don't know, some kind of existential experience, or some being, or some kind of physical phenomenon to, you know, to really grab me and tell me I'm not still in the water tank. I know just what you're asking for, and I was sure looking for it. There's no question, the view out there is absolutely fantastic and the amount you can see of the Earth, we didn't see any stars, I didn't see any stars. And the Earth is really going by fast, even though you're up between a 150, 170 miles, you can see an awful lot and the Earth is going by really fast. For me there was no concept of falling, and the Earth was not down either. We looked down, I would see the Earth but it wasn't down, and if subjectively you could hand me something, and you know I would take it out and drop it like that, I would not expect it to fall. So I did not feel like if I let go of things that I would fall. The zero gravity had already, you know, grabbed me for some period of time. So there was no concept of falling or if I dropped something, that it would fall, it would really just stay right there. And likewise a separation phenomenon of separating from the Earth, really the orbiter was home, and that was the perspective, and the payload bay was the perspective. And in terms of the operation out there, in terms of the translation, in terms of the feeling and all, the extrapolation from all the training and preparation down here to out there, it really worked, as it has in the Skylab program that P.J. flew on, and the J missions Apollo, where you were in zero gravity at EVAs, that extrapolation really worked. But the view is fantastic, it's going by very fast, but on the other hand for me, the Earth wasn't necessarily down. Neither did I have any falling, or separation phenomenon, and really the orbiter itself was my frame of reference.

PETERSON I think I agree with most of that. I felt very comfortable, along from time to time, and I hope there are no psychologists and psychiatrists listening, I have a dream that I'm flying, not in an airplane, just flying. And I think EVA comes very, very close to that. I think when I first climbed out of the hatch, I climbed up on top of, you won't probably another term, the toolbox, it's up on one corner of the payload bay. And from there, the door was open down on one side and the cabin was curved back this way. You can look out through there, there's about a 120 degrees of absolutely nothing in front of you except the Earth and the Sky. And that's kind of an awesome view, and I really enjoyed that. And by the way, what Story said was true, we asked for this maneuver so we could look out and I thought,

boy you ought to see a million stars, it ought to really be beautiful. And it turns out there's enough light in the payload bay, that your eyes don't get dark adapted very well, I guess, and if you stand in the middle of the payload bay, and look out at the night sky, it's looks black, but you cannot see stars. If you got up in a corner, like I managed to do a couple of times, you can see stars. And you probably see about the same number of stars on orbit that you do from the ground. I think that's because of the lights. But I also agree that I had no, from about the first 5 minutes after we cut the main engines off, I never again had much of an up, down reference in terms of any instinctive feelings about falling or dropping anything. You find that, or I found that you adapt very quickly to the concept of 0-g, and I think your frame of reference moves with you. You adapt to what you see visually, you don't have a sense of up, down, the way you do from holding yourself erect in a gravitational field, or pressure on your body or anything. And it was all in all a very pleasant sort of feeling, and a secure kind of a feeling. I never once worried about separating from the ship, or the tethers not working or slipping and losing my grip on a handrail. I think I just went about the work in kind of a business like fashion, and we did a lot of things, we did not have a lot of time to just play around. But when I did get a few minutes ahead and I could stop, I think I'd have to say most of what I experienced was a great deal of pleasure and just from looking at things and seeing the Earth in different perspectives and seeing the colors and looking at the orbiter from a different perspective.

MUSGRAVE The sun goes up and down in a matter of a few seconds. You know, it's like someone turned the light out, it doesn't take 1/2 an hour for the sun to go down or come up the way it does here. When it's coming upon you, no time at all, the sun is down or it's up. The sublimator is putting out these little chips of ice which float away and it's like twinkling stars here and there right up close to you. The things like that that are really exciting.

WEITZ Some things are unexciting, however, and that is that, you know during the Apollo program and thereabouts, we came to refer to the Earth as a blue planet, and even during Skylab which was 11 relatively short years ago, is that I remember making a comment postflight, that the sky is blue, whether you look down through it or up through it, and it was a blue planet. Unfortunately, this world is fast becoming a gray planet. And it was frankly apalling to me, to see how dirty the atmosphere is over nearly every part of the world that we had the opportunity to see. And that included some parts of the oceans where they're close to the continents. But just take a look, if you remember what you could see in that view of the thunderstorms that Bo took, and that's over land, folks, that was over Africa. And Dick Underwood, over here in the corner has looked at more photos, good photos taken from space than probably any other human being. And Dick says that he can tell the

difference, he can show you pictures of the same area side by side, over the last few years, in which our environment, apparently anyway, is just flat going down hill. And I don't know what the message is, but I think that it is not all related to dust storms and volcanoes, because it has a blue haze to it, and looks to me like smoke. What's the message, I don't know, we're fouling our nest some way.

PAO John Getter in the back.

GETTER I have two questions. To start with, it's a follow-on to what you just said, Mr. Weitz. Would you compare as best you could, you talked a little bit about star wars and that sort of thing. Would you compare flying the Apollo capsule up to an orbiting Spacelab, or Skylab, to flying the space Shuttle up into space, the feeling of it, the advancements that you've made and just the emotion of it, how does it compare?

WEITZ You have the feeling, I would anyway, if you were doing the thing with an orbiter, that you've got a vehicle with a little more capability. It's a bigger, more impressive vehicle, I think once the thing is done, you probably have a greater sense of self-satisfaction, because you're maneuvering something that weighs, on orbit we weighed 235,000 pounds or there abouts, as opposed to a command service module with a total weight of 35,000 pounds, something on that order. Some historian will have to correct me, maybe 50,000 at the most. You know the task really from a piloting point of view is essentially the same. We have, the Apollo for its day was a very, had a lot of capability, very flexible system and we have basically that now. So I guess it'd be all be subjective. I think the task is relatively easy. We understand the mechanics of rendezvous and close-in control and we're going to find out what we don't know about it here with a couple missions very shortly starting with...when does SPAS fly? Seven. That's on the next one. Did that answer your question?

GETTER Yeah. Second question for Dr. Musgrave and anybody esle who might want to jump in. You seemed a little unsteady on your feet on the runway out there coming down the ramp. Did this relate to the experiments you were doing that were trying to gain some insight into space adaptation syndrome and as an MD can you offer any insights now that you've been through a mission?

MUSGRAVE You have a little sea legs when you get back home. PJ warned us coming down the chute there that you're going to feel heavier and as he alluded to when you start pulling the g's there you do feel heavier. You feel like maybe you weigh 180 pounds instead of 150 or something like that. The g's, if you're reading g's on the meter and they're .8 maybe they feel like 1.2 or 1.3. So, I don't think any experimentation... but you know in terms of my sea legs and all of our sea legs getting back home that probably relates to adaptation back to 1g from the 5 days of 0g and whatever aerobatics and things I did in the 0g environment but I had sea legs coming back for about a day or so. The day

after, I played some racquetball and went running and was played about as good a game as I did the night before I left so that's maybe about a 24-hour phenomenon.

WEITZ I think, if I can interject, that frankly I was surprised that of the subjective sense of how great an acceleration field you're in after only 5 days. It wasn't as marked as it was on Skylab after 28 days but I expected that. I just frankly did not expect it here and I mentioned what it felt like during the entry. But when it came time to bail out and Bo had a couple tasks to do and I think he looked around for some help once and he was all alone on the flight deck. The rest of us, we were ready to get out. But as I stood up out of the seat to step over the center console it just aboslutely flabbergasted me as to what my sensation was as I raised up out of the seat I was immediately subjectively in a 2g field. And I think that what the sea legs as Story put it which is a very good way to put it. You know you don't have that sensation if you just stand even though you're still standing if you stand stock still. And, but it's as soon as you move your head or actually it's not only your head it's you limbs, but I really think it's your brain, your total system got used to working for several days, in this case 5, without any sensible acceleration environment. And now we put 1g on top of that and I frankly think that you get cross coupling, it's just like procession of a gyro. You're internal gyro if you stand still doesn't bother you. As soon as you move your head this way, and as a matter of fact I did it in the post flight physical, you could see if you close your eyes and move your head rapidly your gyro precesses a little bit and you tend to wobble because you're getting a false impression. But as Story said, I think it was still noticeable the morning of the next day but by the end of the day after landing that it wasn't there.

PAO Okay. Carlos Byars.

CARLOS BYARS (Houston Chronicle) For Story and Don. I noticed when you were outside that your feet seemed to always be floating above your head. Is this just something of the nature of the suit or of the activities? Is there a reason for it? Were you bothered by it, did is hamper you?

PETERSON I think the answer is that that has to do with the way the pressure in the suit and your natural body position positions you when you're hanging onto something with your hand. But no, I didn't, as a matter of fact when I looked at some of the films that you just saw for the first time I was surprised that my feet were as, at the angle they were. I really felt that my feet and body were more a right angles to my arm and when I look at the pictures I realize they're probably 20, 30 or maybe even 40 degrees up from there and at the time it happened I did not realize that at the time it was going on.

WEITZ Well let me say one thing. These guys were

operating down along the handrails along the threshold as anytime their feet got down there level as Bo and I would say "watch the radiators". So we were on them whenever they got, cause we don't want to kick holes in our radiators obviously or that certainly would've shortened the mission.

MUSGRAVE But, of course, you know the feet, the feet are not up and even the slides we showed you here are upside down. Most of the slides are upside down you'll notice the earth is up there and so really the feet aren't up in (laughter). We are in contact with the vehicle with our hands.

WEITZ Well, was it task oriented as opposed to any tendency. Was it a tendency or...

PETERSON I think it's just that when you grab something in that suit instead of your body staying at right angles your body tends to, your feet tend to angle out further behind you rather than up or down.

WEITZ As a matter of fact during the EVA, I mentioned to Bo, you watch these guys and this has gone since Ed White's EVA. You see guys move around except on the moon as long as they're in 0g, you know they're moving around, they're doing all kinds of things with their hands and their upper torso and their legs are sticking straight out. I told Bo I said "you know if you're a professional EVAer you'd probably have your legs cut off because they don't serve any purpose when you're out there.

BYARS Let me ask you about the suits. These were a relatively low pressure suit but how would, how are you going to feel about going to the 8 psi suit?

MUSGRAVE If they give us the same mobility, stability and dexterity obviously that'll be an advancement.

BYARS Well, do you have any experience with the 8 psi suit Story?

MUSGRAVE I do have experience in 8 psi suits but not, not in a water tank or not in a 0g environment. Just you know a 1g evaluation. It's a tougher job because you have to make, you have to make a joint insensitive to pressure. It's like, it's like taking a bread bag which is totally krinkly, you can do anything you want with it and blow a little bit of pressure in that bread bag and it becomes pretty, pretty tough even though know a little celophane bag. And so the more pressure you put in the stiffer it becomes and so all joints are somewhat sensitive to pressure and it's really state of the art to make a joint, even a little finger joint or an elbow joint, which is totally insensitive to pressure. Meaning the force it takes to bend it. How senstive is that to pressure. And especially when you get down to joints that are this small, it's difficult to design a joint which is pressure insensitive. So that's what they're up

against going from our 4.3 up to 8.

PAO Okay, we'll take one more here before we go to questions at the other centers. Paul Recer. Then we'll come back here a little bit later.

PAUL RECER (AP) After you're doing your EVA, have you concluded that the suit is in fact ready now for use on the MMU on down the line. Has the suit proven itself sufficient for that?

PETERSON Yes sir. Based on you know you're taking a data point with only 2 real samples but based on what we saw, yes.

PAO Okay.

WEITZ And that's all we can say, Paul. You know they peformed just like the vehicle did and performed well so we have no basis to say that they won't, but personally I would like to see a little more time on them before we say that they're 100% ready to go in all respects.

PAO Okay. We'll go down to NASA Headquarters for questions and we'll hit the other centers and then come back here to finish up.

PAO (HQ) This is NASA Headquarters.

CRAIG COVAULT (Aviation Week) I've got an EVA question for both PJ and Don. Paul, allow me to play devil's advocate a little bit. Towards the end of the EVA the ground called up permission, in fact, volunteered its approval for a 1 hour extension. What was your reasoning onboard at the time to call them back in and not carry on with that extension?

WEITZ Cause Craig it was, this was again equivalent of a first flight on an airplane and to me I used the same rationale that I used for stating that I felt that we ought to target the landing if all other considerations were equal to a lake bed. And I just felt that I frankly didn't like some things I saw on the characteristics of the airlock hatch when we opened it. I had no real concerns, I just wanted to get through the thing and do the things we wanted to and keep any surprises for later. In case we did run into a surprise, I didn't want it to be to where we had to hurry up. And basically it was just, to me it was another engineering test flight. We fulfilled the objectives of that particular test. And I just wanted to get it done, and we can start expanding the envelope some more on the next time we do it. But I had no particular concern at all, Craig. The guys were obviously performing well, you know the vehicle was going well and I just wanted to get it done.

PETERSON And if I could talk in the point of view, the folks outside, we felt great, and felt like staying out. But at the same time, you really can't argue with the logic P.J. just

used. We'd been out the prescribed amount of time, we've done everything we were supposed to do, and it was reasonable, I think, to stop. But there was no immediate physical reason to stop. We were both in good shape and at that point, both having a good time.

COVAULT Okay, we couldn't hear any of that in Washington, but I'm sure it was good.

WEITZ What can I say?

COVAULT I might have P.J. pursue just very briefly the EVA hatch issue he raised there, then I do have another question for Don.

WEITZ Well, and Story and I were both party years ago to the decision as to what type of hatch design we could come up. Can you hear this one, Craig? Hello, Washington.

COVAULT We've got you now.

WEITZ Okay. And you know the way it does, the hatch doesn't just hinge at the bottom and swing in, nor at the top, or either side, because you then have to make more room inside the airlock to get folks out of the way. We were going for, what at the time, we termed minimum sweat volume. So it's kind of on a yoke arrangement, much like we had in the MDA hatches, or the airlock module hatches in Skylab, so that it opens up off the hatch seal, and then kind of slides down, out of the way. And it's just that the geometry of that thing doesn't lend itself to just, like you would grab a hold a door in your house and unlatch it and swing it open. I think the thing needs some work, it's nothing that's dangerous. I just think it's a thing that needs improvement.

COVAULT Okay, and for Don, I understand your heart rate peaked up to about 130 there during part of the EVA, about double really, what Story's picked up. And I'm curious if that was task orientied or what pushed you to that level?

PETERSON I still haven't debriefed as to exactly when it happened, but there were a couple of times in the EVA. My basic job in the EVA was to support what Story was doing in the way of testing the suit and testing the mobility. And there were a couple of times that things didn't work the way we expected them too. We had some trouble adjusting one of the foot restraints, we had trouble with one of the winches and a couple of other things. And what that did, was threw us behind and also required me to do some tasks that I hadn't planned on doing. And it put me in particular, behind the timeline, because Story was for example waiting for me to get something done and so I was working faster than I normally would have been. And there were a couple of times that I realized I was working pretty hard. I don't think I ever reached a point where I felt fatigued or where I

felt it was necessary to stop. But I would suspect that the higher heart rates were just a matter of work load, a higher exercise rate in the suit. And that's about all I can say until somebody tells me more about exactly where they, what they correlate with in terms of time or activity.

WEITZ Yes. Craig, did you guys, did you see the movie all right, did you see that job he was doing with the ratchet wrench down on the EVA tilt table, or on the IUS tilt table?

CRAIG Yes sir.

WEITZ Those Boeing folks and our DOD friends also have a very strong feeling that they don't want any marks, dings, they didn't even want these guys, the EVA guys to touch their, what's that, the spreader beam, they feel that that thing must remain pristine, so that it can be turned around in time, hopefully to fly on STS-8. And that severely limited Don's availability, the availability of handholds for Don when he was down trying to do that job. And I could tell, that's about the time when he was trying to do that that we got the high 02 use alarm from his DCM. And it may turn out to have been a transducer funny, a shift, temporary shift to low. But I tell you frankly it didn't surprise me at the time, just looking out the window I could see that he was having a difficult time in getting the proper purchase and maintaining a body position so he wouldn't touch the spreader beam, so Bo and I wouldn't hollar at him for getting near the radiators. And he was just working very hard.

PETERSON The suits are heavy, they weigh about 400, 450 pounds when you put a person in them. I was trying to hold on, maintain body position with one hand and work a ratchet wrench with the other hand. And there was a considerable torque load on the ratchet wrench, more so than we had experienced in training. The combination of that just required a lot of hanging on and a lot of cranking with your arms, and it's fairly hard work in the suit. And there were a couple of other times that I was in a similiar type situation where I was using tools or something that again, working at a slower pace, wouldn't require much effort. But like I say, I felt like I was behind and that we should, I should try to catch us up on the timeline, and so I was probably working faster than I'm accustomed to working in the suit, and maybe faster than I needed to be. But I was just trying to keep us on the timeline.

JOHN BISNEY (RKO) We heard two comments on the day the Vice President chatted with you folks. He asked someone in Mission Control, if Karol was feeling better and P.J., you mentioned that when Story was doing a tumble, he was trying to make himself sick again. Without violating the medical privacy rules, I was just wondering if you could comment on those two remarks that we picked up on and confirm or deny?

WEITZ No. I cannot, frankly with our policy as it was

written before STS-5, and we now have a clear understanding of. And let me talk about space adaptation syndrome, is that it is not a debilitating condition. As Don put it, how did you put it earlier today, Don?

PETERSON Debriefed the managers this morning, and I said, I think a lot of people got the idea, you turn green and have open sores, and that sort of thing. And that's not really what happens. Based on what I know about it and previously flights and that sort of thing. At is very worst, it's not as bad as being sea sick. And I'm not sure we fully understand it, and I'm not a doctor, and I don't pretend to. But I think maybe we have perhaps by not talking more about it, we have given the impression that this is something that we're really worried about in terms of the well being of the individual, and I think that's not the concern. The only real concern is that if you've got a guy who doesn't feel very good for awhile, somebody else has got to pick up his work load until he feels better. And that's really the only concern we have.

WEITZ And you know to me, it's an environmental condition that we're going to have to learn to understand the mechanism behind and how to cope with it, just as for the same reason that British sailors came to be called limeys. They finally found out how to take care of scurvy and rickets, and the modern day one is sea sickness. We're working on it, we, the agency is working on a better understanding of the mechanism and how we can head it off.

BISNEY Alright, one other quick question for you. Were you aware of the severity of the problem with the TDRS and were you satisfied with the amount of information you received from the capcom regarding that?

WEITZ Well, I don't mean this to put down our friends at Goddard and Spacecom. Obviously we had an interest in TDRS. Our communication association however, was more directly with the IUS. You know, we carried the IUS up, and in this case it just happened that that IUS had a TDRS on top of it. It could have been anything else. We were disappointed to hear the problems, we still haven't been completely briefed on what the status, the situation is. I'm sure you are all aware is that there is an investigation underway to look into what happened, not some much to place blame, but as to understand the mechanism like any other accident investigation, an airplane accident investigation, understand what happened, so we can head it off again. At the time, I thought we have liked to have had some more information, because as I say even though I just gave you all the reasons why we remote from it, we still had a warm place in our heart for the TDRS, and wanted the thing to get up there and perform. But for the situation, at the time, is that I felt the information was given was adequate and Story had a little closer association with it and so did Don, maybe you guys don't feel that way.

MUSGRAVE I think we had all the information we needed, too. We had done our job and we could wait, we had to get on with the rest of the flight plan and we could get the rest of the details once we got back home.

WEITZ Why is the question asked. Does someone have the feeling that information was being withheld from us?

PRESS My name is Neil Lisson, I represent Argus South African Newspapers and I'd like to take you back, Mr. Weitz, if you would to the rather gloomy pollution picture you painted. Was this problem more noticeable in some areas than others or was it a rather universal problem?

WEITZ It was pretty much univeral, but I would say that it's universal because of the extent of it. I don't see how you keep that thing from spreading over land masses, but what surprised me is in some what you tend to think of as developing countries so therefore I can only assume that it's due to, and perhaps Dick can lend some insight into this, due primarily to the burning of wood primarily whether it be for heat and generation of energy and probably as in some conversations with him yesterday, great segements of the world were doing slash, clear and burn operations. But to me it had a heavy blue quality that I would associate with wood smoke. Now, Dick also tells me in some parts of the world it's due to the burning of soft coal, but it was pretty pervasive I mean it was in Indonesia we saw some of it. Even in New Guinea which you tend to think of as relatively unexplored jungles, in South America, in Mexico. Obviously, in this country where we've seen the deterioration of that in the last 10 years flying around in T-38s. The crud level gets higher and higher and higher. We normally operate around 40,000 feet and it's not uncommon to feel that you are not out of the crud layer yet at 40,000 feet at sometime.

ROB NAVIOUS (UPI Radio) For Story. Based on the performance of you and Don during the EVA, any reason to believe that the solar max repair mission next due on flight 13 would not be a successful exercise?

MUSGRAVE I haven't looked at all the exact details that need to be done there, neither have I gone through that exercise saying our water emersion facility. So, I think we need to look at all the data we collected not only our own experiences there, but we've got 5 hours of excellent closed-circuit TV and that kind of thing. We still don't have a total analysis of our performance out there and also for me to answer that question I'd have to look at exactly what the requirements were on the system and on the person to accomplish that.

WEITZ But there were no surprises. The suit performed as we expected.

MUSGRAVE No surprises.

PAO Okay. We'll go now to the Kennedy Space Center for questions.

RICE WAGNER (Spaceworld Magazine) Considering the way the Challenger handled on reentry, would you have felt confident coming into KSC and does it still look good for landing here for STS-7?

WEITZ Yes. With hindsight I'd have 100% confidence of going into KSC. At the time I wouldn't have but now as I say with hindsight I feel confident in our ability to land OV 99 at the Cape and whether it's going to land there on the next mission or not is going to be a programatic decision. I don't know where that stands.

BOBKO Of course given the day and all that we had to land it.

FRANK YOSENDA (Today, Cocoa) This is directed to the four of you. Following this flight what essentially do you think you're going to do in terms of plans and has the flight changed your life in anyway or changed your plans in anyway?

PETERSON I don't plan to have anymore press conferences. (laughter) No, I don't know. I think we're too soon after the flight for me to try to answer that. We're still in the midst of trying to get everybody on the Center debriefed from what we found, from what we've learned and at some point in time I think most of us are really looking forward to talking to the engineers and the flight controllers and the people on the ground and finding out what they learned because we've really done very little of that. And I'd like to get a couple of weeks off and I understand we have some public appearances to do and maybe after that we'll start looking at what's going to happen later.

MUSGRAVE Musgrave here. I don't think it's changed my life too significantly. It's brought to fruition something that I've been working very hard on for at least 16 years and I'm just looking forward to going again soon as I can.

BOBKO I think it certainly was a great experience. I'm looking forward to going back. I said when I find that I think at Ellington that I though I had imagined everything that could be see in orbit by listening to people who had flown over the time that I had been here, but that's certainly not true. It's beautiful, it's great, I'm hoping to be able to go back sometime.

WEITZ And I essentially echo Don's comments. Right now we're taking one day at a time, waiting to get all the debriefings behind us and to be able to direct our attention back to contributing to the program.

PAO Okay. We'll move now to questions from Marshall Space Flight Center.

JIM ADAMS (Channel 31) In the EVA in using the different tools that you used, the winch and the ratchet wrench, how did the use of those tools and how difficult it was to use it, how did that compare to the simulations you've done in the water tanks?

MUSGRAVE I thought our extrapolation from the water tank to Og was excellent. I think we felt very familiar in the operation out there and we really didn't have any Og surprises.

WEITZ Well, you're right. Maybe no Og surprises but as usual we had some job surprises and I think once again this is, it's relatively minor because we know how to cope with it. But, I think it shows adaptability of having man along and that Don had never really practiced that ratched wrench exercise in the water tank. There was some, we had a locking device on a set of foot restraints that we found out before the flight were over-torqued and the decision was made so that we wouldn't endanger the payload anymore that we'd leave it like it was and we'd fly a special tool to help Don who is responsible for that loosen it up. Well that didn't work either so we had to go to the tool box, get out a set of vice grips that he hadn't spent a lot of time practicing with and I think that, that is typical of our EVA experience, but Story's right in one way and yet in the other is that we did come up against some surprises only because they were unplanned-for events but that they found ways to cope with them and coped satisfactorily and Don did finally get that clamp loose.

PETERSON I'd agree with that and I think that the Og is not nearly as a big factor as just operating in the suit. The suit and the fact that you need to be fastened to your work station and you can practice all of that in the water tank are the big factors and not the fact that you're in Og.

DAVE DOOLING (Huntsville Times) I'd like for either Peterson or Musgrave to elaborate a little bit about how the electrophoresis runs went.

PETERSON So far as we know they went very well. We got a report this morning that said they had some shifts and some pump or flow rates within there and we countered that essentially procedurally and with software. We went into the control program and changed some operating parameters. Onorbit it ran very smoothly. We didn't get anything that was other than those couple of flow parameters that were unexpected. I understand also that post flight we somehow inadvertently someone in powering down the vehicle after we'd gotten out powered down the refrigerator in which the samples are kept for some period of time but the report is that that really did not damage any of the samples that they think everything came out about as well as could be expected. And the onorbit results based on the quick

look was excellent. They said they had fewer problems with bubbles. They understand more about the stability of the flow than they ever did before and they think the results are going to be as good as can be expected and I think they're looking forward to moving into maybe a prototype production type set of equipment.

DOOLING For Karol Bobko. Did I understand you correctly when you were talking about ascent that you had during the main engine burn you had a slight eyeballs-up feeling as well as eyeballs-back?

BOBKO Yes, the thrust vector of the engines. Yes, the thrust vector of the engine goes down towards the bottom of the vehicle so that you get pushed up in your seat and that's noticeable once you get above about 2g's.

DOOLING Okay. And also the dirt on the window comment that Commander Weitz made at booster separation. Did you really come back with a significantly larger amount of crud on the window or was it just lighting angle or whatever it seemed like more at the moment?

WEITZ Larger amount than we launched with?

DOOLING No, than was experience with previous crews.

WEITZ I don't know. We can't really compare it. I can't answer that question. There was a lot more than I expected.

DOOLING Okay, and finally for Story. Did I understand correctly you were standing up in the aft flight deck during landing and if so is that accepted procedure?

MUSGRAVE Through most of the entry I was standing up.

DOOLING That's not normal procedure though is it?

MUSGRAVE No, but we're evolving into an operational vehicle, in which it flies extremely smoothly, the outcome is totally predictable.

WEITZ As I mentioned before, one of the questions that we did want to answer was how reasonable, I think Don eluded to this before, was how reasonable is it in the event of an emergency or an off-nominal situation to send someone down, if you had to, to the middeck, for example to close the circuit breaker, or throw a switch. And this was our first insight into evaluating that, anyway.

DOOLING Okay, so this is something you agreed on beforehand and not something that Story did on the spur of the moment.

WEITZ No, it was something Story did on the spur of the moment. But no one said any quarrel with him, up to this point.

PETERSON No that we've pointed it out.

WEITZ We debriefed management up through and including General Abrahamson and Mr. Weeks this morning, and were straight forward on that. They know what happened, we showed them the same slide of the runway taken from the window.

DOOLING Thank you, no further from Marshall.

PAO Okay, we'll come back here to JSC, if we have any further question to wrap up, David Lee.

DAVID LEE (DISCOVER MAGAZINE) Back to the suits, would you tell us, give us some idea of how constraining they are, if at all, and how easy it was to handle the tools. For example could you do a backyard tune up job on my old jalopy wearing one of these suits?

PETERSON How long would you give me to work on it?

LEE As long as I take, which is several days.

PETERSON I think any tool that you use in the suit takes more time. Ideally, what I think what we ought to strive for in the future is tools that can be used one hand. That is, tools that don't require two hands to operate. For example, I used a set of vice grips on orbit, and you simply can't use a set of vice grips one hand, because you need one hand to hold them, and the other hand to make the adjustment. Once you get them clamped in place, you can start using them one hand. But I think unless you're going to provide foot restraints all over the vehicle so that the person can anchor himself, you need one hand to hold position with, and that says you have one hand remaining to work with the tool. And a lot of our tools are not, certainly optimized for one handed operation, and that's something we might look at in the future. On the other hand, what we have is a standard set of tools that I think almost anybody in this program is familiar with and knows how to use on the ground, and there's some trade-off in that. These tools didn't require any special design to amount to anything, and you can use them. We had a couple of cases on orbit this last time where I did things that I really had not spent any great amount of time practicing, and although it took a little more exertion and a little more time, it was certainly do-able. And I think that's about the best answer I can give you. It's hard to say that a particular tool is 70 percent more difficult in space, or in the suit, than it is on the ground. We haven't done that kind of evaluation, I don't think.

WEITZ I think a lot of it depends on the task you're trying to do with the tool. Given that the gloves are bulky and

cumbersome, it's kind of the best I can come with, is let's take a pair of snowmobile mittens, is probably a poor example for down here, but heavy gauntlets. But a screwdriver, for example, given a task you're trying to do in a cargo bay, may in fact not be a one handed tool. It just isn't you don't have the dexterity in order to use a screwdriver with that pressurized glove you do in shirt sleeves in your backyard. As a matter of fact, I would say for instance, pliers and screwdrivers which we think of as one handed tools, probably don't meet that classification for EVA applications.

LEE But as things stand now, do you feel you're capable of doing actual satellite maintenance and repair?

PETERSON I think you can, and I think that for two reasons. Number 1, I think we will learn better how to use the tools we have. And I also think that if we run into in the training and the development, a situation that requires special tool or a special technique, we'll develop the tool or the technique as we go along. I have every confidence that we won't send people out to do a job that they're not prepared to do.

LEE Just one last thing, P.J., could you describe for us the handling characteristics of Challenger as an airplane, and what would you compare them to, and were they different than Columbia?

WEITZ I've got no basis to compare it to Columbia, neither do any of the Columbia drivers have a basis to compare it too.

LEE How would you describe them, just...

WEITZ Solid, absolutely solid. I mean it's a good, tight, control system with a solid machine. It is so much, the STA is in the shuttle training aircraft is an invaluable training tool. As a matter of fact, in listening to some tapes of the landing, of the descent and landing is, one of my first comments after the wheels stopped on the runway, was that if you can do it in the STA, you can do it in the real world. Because the STA is an airplane of its own right, even though it's a flying simulator, it does respond in its own way to gusts in particular. And that's why I mentioned that when we flew through a gust is that that thing just chunged right through it and with no upset of the vehicle, you could feel it. But I just can't say too much about it, which is the same thing I've understood from the guys who flew the first five flights, and I don't remember about 101, what their particular evaluation of that was, but it's a good solid, tight vehicle.

PETERSON From a third seaters point of view, I was only standing up a couple of times during entry where I had to reach something, or wanted to reach something. But the vehicle felt more stable to me under a g and a half than it normally feels if

you stand up on an airliner. There was less motion, there was less turbulence, there was less vibration. It's essentially solid as rock, and I think Story stood up essentially all the way to the ground, and I think we're both confident that you wouldn't have any problem, even climbing down to the middeck and climbing back up if you wanted to do that.

WEITZ For those technical writers who may interested, I think that the initial, what I've heard, is that the quarter hertz oscillation, the lateral oscillation that occurs, where does that occur, around 2-1/2 to 4, somewhere in there. Anyway slightly in a supersonic range, was there, even though we did not sense it, as I understand I think no crew has, so far is what John says. And then we got, while we were prepared for it, we did get the transsonic buffet as we went through .95 mach down to, and it was gone by the time we came below .92.

PAO Okay, Paul Recer, you had a question.

RECER In General Abrahamson's April 9th news conference, he said that we would discuss SAS in a statistical way, is the way he put it. So I've got a statistical question. What percentage of the crew experienced SAS on this flight?

WEITZ It's got to be part of the general statistics, Paul, and I really think we have to put this into context and that's going to be handled by, we're urging the folks who are concerned with that from the medical aspect to put together a story on it, so it's not considered a bugaboo.

RECER Okay, well, you had some experiments on board in which you were exploring some elements of the SAS, did those experiments give you any insight?

WEITZ I don't know, frankly, is that they are relatively simple experiments, and we're primarily honchoed by Bill Thornton, who is in the astronaut office, and we did the protocol for him, which consisted mainly of some controlled head motions and some eyes-alone motion, and maybe Story, I don't know. Bill is trying to identify the causitive mechanism of this, and he keeps saying, boy, do we have good data now, and I don't know what that means, because I haven't had time to talk to him. But I think he's talking about what he's seeing and the difference between folks response in flight as opposed to what he's seeing on the preflight and postflight.

RECER Dr. Musgrave, did you get any insights from the experiments you ran?

MUSGRAVE Not so much the experiments, the experiments, that we have no way to look at the data. The experiments is to put the electrodes on and look at the relationship between head motion and being able to track single target with the eyes...

WEITZ It's not subjective at all, Paul.

MUSGRAVE It's looking at the relationship between head motion and eye motion and eyes tracking a static target or tracking a target that's attached to the thing. All that data went into the OPS recorders and was dumped down. So on board, there was no real data. If you're asking my technical opinion, I think the sensory conflict theory is, in my own mind, I favor that theory. In other words the organism senses that this is the down and then either visually or by some other mechanism, vestibular stimulation or any of the other sensory's, there's a conflict. There's a down and yet you look out the window and the Earth is down there and you relate to the Earth as being down, and there's that conflict. So technically, physiologically, that's the theory that I would favor.

RECER Is this a visual conflict, or a conflict caused by the visual perception?

MUSGRAVE From any of the sensors. You can have a visual perception, we train all the time with the bird in the horizontal position. We also go vertical with it, we spend more time in the horizontal position. And you get the feeling that the floor ought to be down and the ceiling be up. Or that the Earth is down or that you know, away from the Earth is up. And you have also bodily sensors, such as the vestibular system or what we call the appropriaceptive system. Even the cardiovascular system, you know, when you jump out of bed in the morn, you're lying like this, and you go up like this, you got lower blood pressure going to the head, you have a shift of fluid down into the legs. It's possible even the cardiovascular system makes inputs to the brain as to where is up and where is down or am I rotating or not. And that's, so technically that would be the theory that I favor.

PAO Carlos Byars, right here.

BYARS Paul, on some of the other missions at the conclusion of the mission the members of the crew have had some comments not too complimentary about various things where they were they felt they were surprised to find by the way various things worked. In one case the crew expressed surprise and distinct unhappiness that they had not been told about how insects were going to be mixed. They expected to find them in separate compartments and they were mixed and this created some unhappiness on the part of the crew. You've commented about having to break out, or Don had to break out a new tool, a pair of vice grips to work on something. What else about this particular mission has disturbed you in that fashion and is it possible that the crews are just getting a little bit picky.

WEITZ I think there's a lot to the latter theory. Frankly, we feel obligated as engineers and some folks still consider themselves test pilots, that you have to find some

things wrong and we did have some, what was that expression you used Carlos concerns or worries. I didn't have that. There were a couple of annoyances. One was along the very lines, and we've complained about it, but you know this is putting together and we have on shorter orders complicated mixes of things that are going in there not only major experiments but minor experiments that on the surface out of context you think that's minimal impact, we'll put it in. Well, then you get a surprise and as I mentioned before surprises take up some of you time and the best one was we had another experiment called, or the best example of an annoyance more of anything else to me was we had a Monodisperse Latex Reactor whatever that is but we call it the MLR and it needed some power sources. And you know, we had the information available to tell us that the experiment derived DC utility power from 2 sources in the orbiter and the rest of the world did too, but we weren't smart enought and the folks who were didn't think that it was an impact on training, but sure enough we got on orbit and of our 3 or 4 available outlets down in the mid deck 2 of them were already taken up the MLR. And that's an annoyance because we had gotten used to Don, I don't know what'd you plug in? The teleprinter?

PETERSON There's all, there's a variety of things that use DC power and in training we got in the habit of when you needed to hook one of those things up you went to the nearest DC utiltiy power outlet which is like a wall plug and if something was plugged in there you disconnected that and plugged in whatever you were using at the time. And you learn to do that over a year of training and you get on orbit and you find it's like, it's like going into your bedroom and wanting to plug in your reading lamp and you find your wife's got all the plugs full and not only that she doesn't want you to move anything. And that's bad enough, but if she didn't tell you not to move anything and you've already moved it then you really feel bad about it. And that's the kind of situation we were in. It's not a major, it's not a major problem or a major grievance it's just that you like to be aware of those things in advance primarily because you can, you can absolutely ruin somebody's experiment that he spent a year or 2 years or 5 years getting ready to fly by turning off the power to it when you shouldn't have and you're likely to do that if you don't understand that you just see this wire that trails off through the bulkhead and goes somewhere and maybe you don't even know that which experiment that wire goes to if you haven't trained for that and that's the kind of thing you want to avoid. It's not, it's not the fact that you mind taking the length of wire and finding another outlet it's that you're liable to make a mistake that costs you and the program and the people involved a lot of headaches.

WEITZ What we're up against there is our approach to the program where we are going to try to reduce the training time required to go fly a mission and therefore we're going to reduce the fidelity, really, and I think that that is a commendable goal I'm just not certain we're there yet. And until we put together,

you know, it takes time and it takes people in order to have 100% faithful replication in a simulator while you're training of what you're going to fly with especially if the same simulator in 4 uses in a row has to serve 4 different crews with 4 different configurations and I'm not sure that as long as we try to pare down on the training requirements to make the preparations for the flights from our standpoint cheaper is we're not going to come up against more of these surprises but the pitfall and Don put it very well it's not that it's there so much it's just the fact, the surprise, it's something new, it causes a little discussion, there goes 5 or 10 more minutes of time plus the risk of frankly screwing up an experiment as he put it that and you feel personally responsible when you do that.

MUSGRAVE Mission productivity is inversely related to the number of surprises. Almost by definition if you don't have surprises it means you stayed on the timeline, the mission got done what it was supposed to get done.

WEITZ And now we have to weigh that off against how much we want to pay to get 100% productivity.

MUSGRAVE The magic of this mission was there were very darn few surprises either vehicles experiment or anything else.

PAO Okay let's take one more here and then we'll knock it off. Van Hackett in the back here.

VAN HACKETT The news deparment has been bombarded by a number of questions in the media in Lexington, Kentucky for Story Musgrave. They want to know what the highlight of the mission was for you and what do you think its most important accomplishment was.

MUSGRAVE Delivering the IUS TDRS and the EVA, the space walk and electrophoresis experiment. I think those are some of my personal highlights and bringing the Challenger back in what everyone is saying is in fantastic shape and there should be a fairly rapid turnaround for that vehicle.

PAO All right. Thank you very much for coming and again we do have copies I hope of the status report, latest status report on the Tracking Data Relay Satellite out in the news rooms.

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